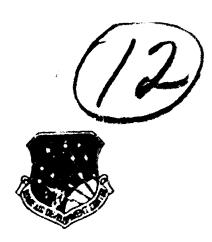
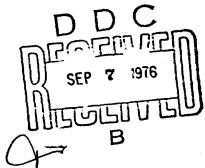
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RADC-TR-76-180 'In-house Report June 1976



VHF/UHF Antenna-to-Antenna Coupling Test Report

Kenneth R. Siarkiewicz Robert L. White



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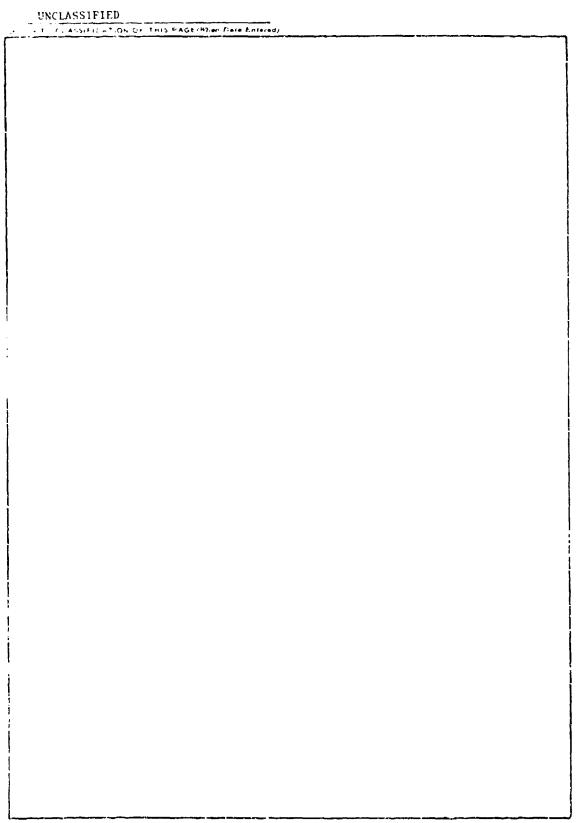
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1. INTRODUCTION

The objective of this effort is to provide coupling data on four communications antennas utilizing specified antenna geometries of horizontal separation and vertical displacement. Three of the antennas operate in the CHF band, while the fourth operates in the VHF band.

The remainder of this report is divided as follows. Section II outlines the background of the problem and the requirement for the data. The following three sections provide descriptions of the antennas, test site and test equipment (including test procedures), respectively. Section VI discusses the system calibration data to be used in conjunction with the measured antenna coupling data to obtain the antenna-to-antenna coupling. The final section provides oscilloscope photographs of the measured antenna coupling data.

II. BACKGROUND

The Air Force Communications Service 'AFCS) is responsible for the design, installation and maintenance of Air Force ground communication systems. As such, it is frequently faced with the task of locating more than one system at the same location. Although the systems may be operating as widely separated frequencies, the possibility of mutual interference is still great. This is due to the fact that no system transmits

just one frequency and no system is sensitive to just one frequency.

There are three principal methods that can be used to reduce the risk and the effects of mutual incompatibility. These are frequency separation, time separation and spatial separation.

The AFCS installations make use of both frequency and spatial separations. However, data is lacking on the antennational to-antenna coupling as a function of frequency and horizontal separation and vertical displacement between transmitting and receiving antennas. The data contained in this report provide the spatial information for specific geometries and antennas in the VhF and UhF frequency bands.

III. DESCRIPTION OF ANTENNAS

This section contains a summary of the characteristics of each antenna tested. Photographs of the antennas are included as well as a table outlining the most relevant characteristics.

Type AT-197/28 (Figure 1.)

The AT-1977CF is a vertically polarized disc-cone antenna operating in the 225-466 MHz frequency range. It possesses a radiation pattern which is circular within 0.5 dD and a 1.6:1, maximum, standing wave ratio to a 50-chm system.

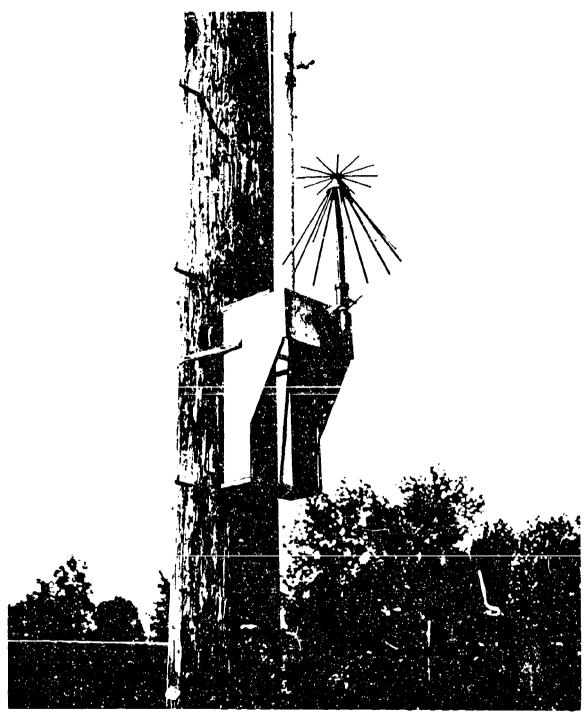


Figure 1. Type AT-197/GR

Type AS-1018/URC (Figure 2.)

The AS-1018/PRC antenna assembly is a vertically polarized, broadband communications antenna used in the 225-400 MHz frequency range. The horizontal radiation pattern is circular within ± 1.0 dB. The input impedance is 50 ohms, with a standing wave ratio of 2.0:1.0. The gain of the antenna is ± 5 dE above an isotropic source.

Type AS-1097/GR (Figure 3.)

The AS-1097/GR antenna is a vertically polarized, four-element stacked array designed to operate in the frequency range 225 MEz to 400 MEz. The input VSWR is less than 2:1 to a 50-ohm transmission line. The horizontal radiation pattern is circular within ±0.75 dE. Antenna gain is a minimum 4 dE above a half-wave dipole.

Type AS-1181/UR (Figure 4.)

The AS-1161/UR antenna is a vertically polarized half-wave dipole encased in a Fiberglas radome making it completely waterproof. The antenna is designed to operate throughout the 100-156 MHz frequency range without field adjustments. The VSWR is less than 2.0 to 1.0, maximum, across the entire frequency range. The horizontal pattern of the antenna is circular within +0.5 dB for any angle in azimuth.

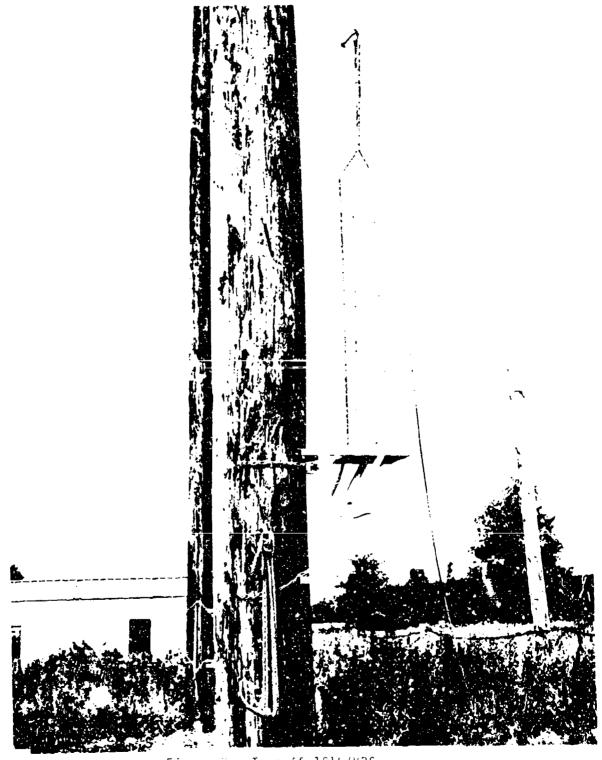


Figure 2. Type AS-1018/URC

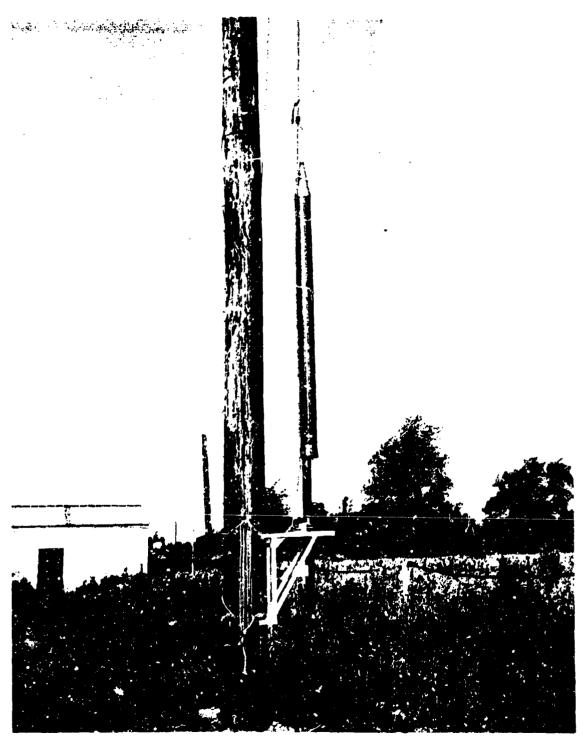


Figure 3. Type AS-1097/GR



Figure 4. Type AS-1181/UR

TABLE 1
TEST ANTENNA
TABLE OF SPECIFICATIONS

ANTENNA TYPE	FREQ. RANGE (MHz)	POLAR.	GAIN (dB above isotropic)	IMPEDANCE (ohms)
AS-1018/URC	225-400	Vertical	5	50
AS-1181/UR	100-156	Vertical	*	*
AT-197/GR	225-400	Vertical	0.3	52
AS-1097/GR	225-400	Vertical	4.0	*

* Not listed

NOTE: All beam patterns are circular

IV. DESCRIPTION OF TEST SITE

This section contains a summary of the test site and the location of the mounting poles with respect to each other. Also described are the mounting arrangements of the four antennas on the three poles to simulate the specified horizontal and vertical separation distances.

All field tests for the antenna coupling program were conducted at the Stockbridge Test Annex located twenty-five miles southwest of Griffiss Air Force Base.

Three sixty-foot telephone poles were erected and aligned to provide straight-line horizontal separation distances of 6, 7, 8 and 20 feet.

The antennas were mounted on any of the three telephone poles (which were unguyed). The poles were standing in line with approximate center-to-center separations as shown:

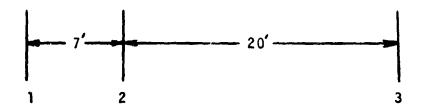


Figure 5. Pole Numbering and Positioning

In the first series of tests (single pole), two antennas were mounted on the same pole. In all cases the top of the lower antenna was positioned to be 36.5 feet above the ground. The bottom of the upper antenna was then mounted to be either 41.5 or 46.5 feet above the ground. This simulated a separation distance of 5 or 10 feet, respectively. Any one of the four antenna types could be used for the bottom antenna and matched against any of the four antenna types mounted at the higher level.

In the second series of tests, poles 1 and 2 were used to effect horizontal separation distances of 6, 7 and 8 feet. This was accomplished by rotating the antenna brackets (Figures 1-4) around the poles. Any one of the four antennas was mounted on one pole so that its top was 36.5 feet above

ground. Another antenna was mounted on the second pole similarly to effect a zero vertical displacement, or it was mounted such that its base was 41.5 or 46.5 feet above the ground, simulating a vertical displacement of 5 feet or 10 feet, respectively.

In a final series of tests, the antennas were mounted on poles 2 and 3, effecting a separation distance of 20 feet. The positioning of the antennas on the poles to simulate vertical displacements of 0, 5 and 10 feet was identical to that used when the antennas were mounted on poles 1 and 2.

During the test which involved a vertical displacement, first the lower antenna was excited and the upper antenna loaded and then the upper antenna was excited and the lower antenna loaded for second case.

The quantity measured in all cases was the power received compared to the power out of the signal generator. This also includes the loss in the cables between signal generator and antenna and between measurement equipment and antenna. Each of these cables was seventy-two feet long and nomenclatured as RG-214. The total loss in both lengths of cables is shown in Figure 7.

The test equipment was housed in a transportable shelter located 20' from the telephone poles.

ilinety percent of the measurements were conducted on dry ground, with the daily temperature in the 50 to 80 degree range.

V. TEST PROCEDURES

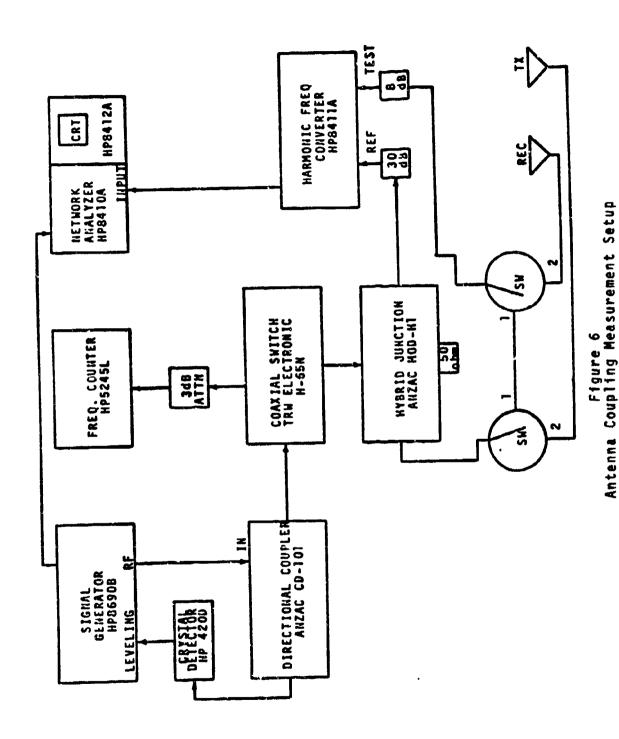
This section lists in step-by-step form the measurement procedure used to obtain the coupling data shown in the following sections. The block diagram of the measurement setup is also provided in this section, as well as a table showing name; manufacturer and model number of the measurement equipment.

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Antenna Coupling Calibration and Test Procedures (to be used in conjunction with figure 6.)

- 1. All test equipment turned on for at least one-half hour prior to test and calibration.
- 2. Place RF coaxial switches in position #1.
- 3. The signal generator is in automatic leveling (ALC).
- 4. Sweep selection in CW.
- 5. Increase the generator power output until the Network Analyzer REF CHARNEL LEVEL is in the (OPERATE) range.
- 6. Position the generator (start/cw) and (stop/ ΔF) dial indicators to the limits of the desired frequency range to be measured.
- 7. Place the generator sweep selector switch in the MANUAL position and the manual sweep knob in ccw position.
- E. Turn the manual sweep knob clockwise across the desired frequency range. Observe that the REF. CHANNEL LEVEL meter remains in the OPERATE range, indicating the ALC is working properly.

- 9. Adjust the AMPLITUDE TEST CHANNEL GAIN DB of the Network Analyzer so that the signal level will coincide with the zero reference of the scope display (topmost line).
- 10. Place the sweep selector in the TRIG position.
- 11. Press the TRIG button. The zero trace of the display will be the calibrating reference of the signal straight thru the switches.
- 12. Place the coax switches in position #2. This places the Tx and Rx antenna circuits in the gain test circuit of the harmonic frequency converter.
- 13. Press the TRIG button. The display trace will show the attenuation of the Tx to Rx antenna circuits from coax switch to coax switch. This also includes the loss in the two 72 foot cables. The known attenuation of these RG-214 cables must be removed from the attenuation of the display of the frequencies of interest. The result is then the antenna-to-antenna coupling in decibels.



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TABLE II
TEST EQUIPMENT LIST

NAME	MANUFACTURER	MODEL
Signal Generator	Hewlett Packard	8690B
Frequency Counter	Hewlett Packard	5245L
Hetwork Analyzer	Hewlett Packard	8410A
Harmonic Freq. Converter	Hewlett Packard	8411A
Display Unit	Hewlett Packard	8412A
Crystal Detector	Hewlett Packard	420D
Directional Coupler	Anzac	CD-101
Coaxial Switch	TRW	H-65N
hybrid Junction	Anzac	на

VI. SYSTEM CALIBRATION

This section discusses the linearity and dynamic range of the coupling measurement system and provides the calibration data needed to arrive at the figure for antenna-to-antenna coupling using the data presented in the following section. An example of this calculation is also given.

On Figure 7 photo #1 indicates the 70 db dynamic range of the system. It also shows the excellent linearity of the system over the 100-400 MHz frequency range.

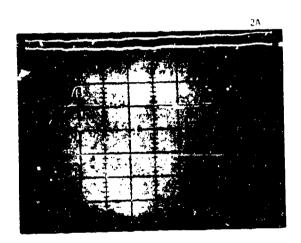
Photos 2A and 2B show the loss in both lengths of RG-214/u cable in the 100--200MHz frequency range. Photo 2A is calibrated at 10 dB/cm, photo 2B is calibrated at 1 dB/cm.

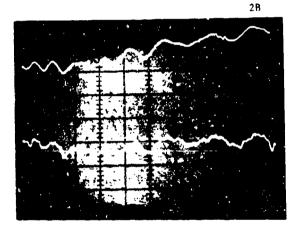
Figure 7.

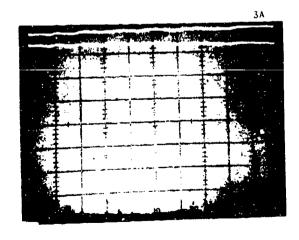
SYSTEM CALIBRATION SHOWING DYNAMIC RANGE OF 0 to 70 dB.

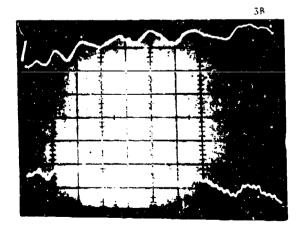
RG-214/U 72 FEET FREQUENCY RANGE 100-200 NHz A. 10 dB/CM B. 1 dB/CM

RG-214/U 72 FEET FREQUENCY RANGE 200-400 MIZ A. 10 dB/CM B. 1 dB/CH









A

Photos 3A and 3B show the loss in both lengths of RG-214/u cable in the 200-400 MHz frequency range. Photo 3A is calibrated at 10 dC/cm, photo 3B is calibrated at 1 d3/cm.

These figures of cable loss must be taken out of the photographic data presented in section VII.

For example, assume the AT-197 is the transmitting antenna and is located 36.5 feet above ground. If the other AT-197 is the receiving antenna and is also located 36.5 feet above the ground, then Plate 21 shows the coupling between these antennas as a function of frequency for a separation distance of 7 feet. At a frequency of 300 MHz, Photograph 1 on this plate indicates a value of approximately -2¶.5 dB.

From Figure 7, photograph 3E, the attenuation of the two 72-foot cables is found to be about -6 dB. Thus, the antenna-to-antenna coupling can be calculated as -27.5 - (-6) = -21.5 dB.

VII. TEST RESULTS

This section presents the results of the field tests performed. The data is divided into three sections. The first section contains the data obtained when both antennas are located on the same pole.

The second section contains data for horizontal separation distances of 6, 7 and 8 feet. Data were primarily obtained for 7 feet. Conversion factors relating this data to the other

two distances are given, and their use is shown by example.

The final section contains data for a horizontal separation of 20 feet.

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All sections contain data for vertical displacements of 0, 5 and 10 feet, except the first which shows data for only the latter two vertical displacement distances.

For ease in locating the data for a particular pair of antennas, an index of test photos is provided immediately following the textual description of the test results.

Coupling levels between different test antennas can be read directly from the photographs. Frequency is indicated in MHz/cm on the x axis. Antenna coupling in dB is indicated on the y axis. Figure 7 shows the loss of 144 feet of RG~214 cable over the 100-400 MHz frequency range. The cable loss at a particular frequency must be subtracted from the coupling level on the photograph to indicate the actual antenna to antenna coupling. An example of this calculation is shown in the preceding section.

Data for the single-pole measurements can be obtained directly from the plates in section 1. Briefly, the plates are arranged in numerical order, based on the model number of the transmitting antenna. Four additional plates are included for the AS-1181 antenna showing coupling data in the VHF range.

For example, assume the transmitting antenna is the AS-1018 and the receiving antenna is the AS-1097. The heights of the antenna are 36.5 feet and 46.5 feet, respectively.

The frequency of interest is 270 MHz. From plate 7, photo 3, the coupling is found to be -49 dB. The cable attenuation shown in photo 3B of figure 7 is -5.6 dB. The antenna-to-antenna coupling is calculated as -49 - (-5.6) = -43.4 dB.

Section 2 presents coupling data and calibration factors for horizontal separation distances of 6, 7 and 8 feet. This data is presented on two separate plates for all antenna pairs except for the following two cases:

- 1. AS-1181 transmit to AS-1097 receive (Plate 49). The calibration factor is shown in the first photo instead of on a separate plate.
- 2. AS-1181 transmit to AS-1181 receive (Plate 58). The frequency range measured is out of band for this antenna. The data will be used to validate future predictive efforts and is included only for completeness.

Use of the data in this section involves one additional step in the process previously shown for the single-pole measurements. First the coupling is found for the specified antenna pair, the specific frequency and the particular antenna heights from the first plate of each pair. This provides data on coupling for a horizontal separation distance of 7 feet (for example, Plate 39). If data is required for either 6-foot or 8-foot separation distances, a correction factor must be obtained from the second plate in each pair (for example, Plate 40).

Either one of two formats for the correction data is presented

on the second plate. In the first format (for example, Plate 22), three curves are displayed on a single photograph. At the left, the upper line provides coupling data for a six-foot horizontal separation distance. The middle curve shows data for a seven-foot separation distance, and it is a repeat of the data shown in photograph 1 on the first plate of the pair (for example, Plate 21). The bottom line is the coupling that occurs when the antennas are separated by eight feet. When both antennas are at the same height, coupling data can be obtained from the calibration photograph directly, without reference to the first plate of the pair.

In the second format, two correction photographs are on the second plate of the pair (for example, Plate 40). One photograph shows coupling for a 6-foot separation distance, and the second displays coupling for an 8-foot separation distance. Data for a 7-foot distance must be obtained from the first plate of the pair (for example, Plate 39).

If the data is required for vertical displacements of either five feet or ten feet and a horizontal separation of six feet or eight feet, then the difference between the coupling for six or eight feet and seven feet respectively must be applied to the coupling on the respective height photo given on the first plate of the pair.

As an example, assume that the AS-1097 is used as the transmitting antenna, and the AS-1018 is used as the receiving antenna. The data on Plate 39 shows that when both antennas

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are at the same height, the coupling at 220 MHz for a separation distance of 7 feet is -31 dB. On Plate 40, the photo listed as six-foot separation indicates a coupling level of -30 dB. The eight-foot coupling level on the same plate is -33.5 dB. The correction factors for six-foot and eight-foot separation distances are +1 dB and -2.5 dE, respectively.

Therefore, when the AS-1097 is located at 41.5 feet above the ground, and the AS-1018 is located 36.5 feet above the ground (transmitter and receiver separated by 5 feet with the former higher), the coupling is found from photo 3 on Plate 39 as -47 dL for a six-foot separation, -48 dB for the seven-foot separation and -50.5 dB for an eight-foot horizontal separation distance. The respective calculations are:

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6 - fout: -48 + 1 + -47 dB

7-foot: read directly as -48 db

 $8-f_{\text{oot}}: -48 - 2.5 = -50 \text{ 5 dB}$

To obtain the antenna-to-antenna coupling, these figures must be corrected for the cable losses in the transmit and receive equipment chains. From photo 3B of Figure 7, the attenuation in the cables is found to be -5 dB. Thus, the antenna-to-antenna coupling for each separation distance is:

6-foot: -47 - (-5) = -42 dB

7-foot: -48 - (-5) = -43 aB

S-foot: -50.5 - (-5) = -45.5 dB

Finally, section 3 provides coupling data for a horizontal separation distance of 20 feet. I'se of the data in this section

is identical to that in section I on the single-pole measurements. See the previous example for those measurements as a guide to the handling of the data in section 3.

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TABLE III - INDEX OF TEST PHOTOS

Section 1 - Single Pole Measurements

		• •	
Plate 1 -	TX ANT AT-197 (36.5') FREQ. RANGE 200-400 MHz	RX ANT (41.5')	AT-197 (1) AS-1018 (2) AS-1097 (3) AS-1181 (4)
Plate 2 -	TX AHT AT-197 (41.5') FREQ. RANGE 200-400 MHz	RX AHT (36.5')	AT-197 (1) AS-1018 (2) AS-1097 (3) AS-1181 (4)
Plate 3	TX ANT AT-197 (36.5') FREQ. RANGE 200-400 MHz	RX ANT (46.5')	AT-197 (1) AS-1018 (2) AS-1097 (3) AS-1181 (4)
Plate 4 -	TX ANT AT-197 (46.5') FREQ. RANGE 200-400 MHz	RX ANT (36.5')	AT-197 (1) AS-1018 (2) AS-1097 (3) AS-1181 (4)
Plate 5 -	TX ANT AS-1018 (36.5') FREQ. RANGE 200-400 MHz	RX ANT (41.5')	
Plate 6 -	TX ANT AS-1018 (41.5') FREQ. RANGE 200-400 MHz	RX ANT (36.5')	AT-197 (1) AS-1018 (2) AS-1097 (3) AS-1181 (4)
Plate 7 -	TX ANT AS-1018 (36.5') FREQ. RANGE 200-400 MHz	RX ANT (46.5')	AT-197 (1) AS-1018 (2) AS-1097 (3) AS-1181 (4)
Plate 8 -	TX ANT AS-1018 (46.5') FREQ. RANGE 200-400 MHz	RX ANT (36.5')	AT-197 (1) AS-1018 (2) AS-1097 (3) AS-1181 (4)
Plate 9 -	TX ANT AS-1097 (36.5') FREQ. RANGE 200-400 MHz	RX ANT (41.5')	AT-197 (1) AS-1018 (2) AS-1097 (3) AS-1181 (4)
Plate 10-	TX ANT AS-1097 (41.5') FREQ. RANGE 200-400 MHz	RX ANT (36.5')	AT-197 (1) AS-1018 (2) AS-1097 (3) AS-1181 (4)

```
Plate 11 - TX ANT AS-1097
                                  RX ANT AT-197
                                 (46.5') AS-1018 (2)
            (36.5')
                                          AS-1097 (3)
          FREQ. RANGE 200-400 MHz
                                          AS-1181 (4)
                                  RX ANT AT-197
                                                  (1)
Plate 12 - TX ANT AS-1097
                                  (36.5') AS-1018 (2)
             (46.51)
                                          AS-1097 (3)
          FREQ. RANGE 200-400 MHz
                                          AS-1181 (4)
                                  RX ANT AT-197
Plate 13 - TX ANT AS-1181
                                   (41.5') AS-1018 (2)
              (36.5')
                                          AS-1097 (3)
           FREQ. RANGE 200-400 MHZ
                                   RX ANT AT-197
Plate 14 - TX ANT AS-1181
                                   (36.5') AS-1018 (2)
              (4 1.5 ')
           FREQ. RANGE 200-400 MHZ
                                          AS-1097 (3)
                                   RX ANT AT-197
Plate 15 - TX ANT AS-1181
                                  (46.5') AS-1018
            (36.5')
                                           AS-1097 (3)
           FREQ. RANGE 200-400 MHz
                                   RX ANT AT-197
 Plate 16 - TX ANT AS-1181
                                  (36.5') AS-1018 (2)
              (46.5')
                                           AS-1097 (3)
           FREQ. RAHGE 200-400 MHz
                                           AT-197
                                   RX AN
 Plate 17 - TX ANT AS-1181
                                   (41.5 ) AS-1018 (2)
             (36.5')
                                           AS-1097 (3)
           FREQ. RANGE 100-160 MHz
                                           AS-1181 (4)
                                           AT-197
                                   RX ANT
 Plate 18 - TX ANT AS-1181
                                   (36.5') AS-1018 (2)
              (41.5')
                                           AS-1097 (3)
           FREQ. RANGE 100-160 MHz
                                           AS-1181 (4)
                                    RX ANT AT-197
Plate 19 - TX ANT AS-1181
                                   (46.5') AS-1018 (2)
               (36.5')
                                            AS-1097 (3)
            FREQ. RANGE 100-160 MHz
                                            AS-1181 (4)
                                            AT -197
                                    RX ANT
 Plate 20 - TX ANT AS-1181
                                   (36.5') AS-1018 (2)
              (46.51)
                                            AS-1097 (3)
            FREQ. RANGE 100-160 MHZ
                                            AS-1181 (4)
```

権が全身に対対に対けたでは、4分には中国権決定を支える法院保護、領域から深行者は対抗措施できまっているとうできないます。 こうこうきょほうじょう

- children con a final matter speaking with the control of the wear con

```
Section II - Horizontal Separation of 6, 7, 8 feet.
Plate 21 - TX ANT AT-197
                                      RX ANT
                                               AT-197
           HEIGHT 36.5'
                                               36.5'
                                      HEIGHT
                   36.51
                                               41.5'
                                               46.51
                   36.51
                                               36.5'
                   41.5
                   46.51
                                               36.5'
           FREQ. RANGE 200-400 MHz
Plate 22 - TX ANT AT-197
HEIGHT 36.5'
                                      RX ANT
                                               AT-197
                                      HEIGHT
                                               36.5
           HORZ. SEPARATION 6' - 7' - 8'
           FREQ. RANGE 200-400 MHz
Plate 23 - TX ANT AT-197
                                      RX ANT
                                               AS-1018
           HEIGHT 36.5'
                                      HEIGHT
                                               36.5'
                   36.51
                                               41.5'
                                               46.5'
                   36.5'
                   41.5'
                                               36.5'
                   46.5'
                                               36.51
           FREQ. RANGE 200-400 MHz
Plate 24 - TX ANT AT-197
                                      RX ANT
                                               AS-1018
           HEIGHT 36.5'
                                      HEIGHT
                                               36.51
           HORZ. SEPARATION 6' - 7' - 8'
           FREQ. RANGE 200-400 Mhz
Plate 25 - TX ANT AT-197
                                      RX ANT
                                               AS-1097
            HEIGHT 36.5'
                                      HEIGHT
                                               36.5'
                   36.5'
                                               41.5'
                   36.51
                                               46.5'
                                               36.5'
                   41.51
                   46.51
                                               36.5'
           FREQ. RANGE 200-400 MHz
Plate 26 - TX ANT AT-197
                                      RX ANT
                                               AS-1097
            HEIGHT 36.5'
                                               36.5'
                                      HEIGHT
           HORZ. SEPARATION 6' - 7'
                                      - 8'
           FREO. RANGE 200-400 MHz
Flate 27 - RX ANT AT-197
                                      RX ANT
                                               AS-1181
            HEIGHT 3€.5'
                                      HEIGHT
                                               36.5'
                   36.5'
                                               41.5'
                   36.51
                                               46.51
                   41.5'
                                               36.51
                   46.5'
                                               36.5'
            FREQ. RANGE 200-400 MHz
```

```
AS-1181
                                      RX ANT
Plate 28 - TX AHT AT-197
                                               36.5'
                                      HEIGHT
           HEIGHT 36.5'
           HORZ. SEPARATION 6' - 8'
           FREC. RANGE 200-400 MHZ
                                               AT-197
                                      RX ANT
Plate 29 - TX ANT AS-1018
                                               36.51
                                      HEIGHT
            HEIGHT 36.5'
                                               41.5'
                   36.51
                                               46.5
                   36.51
                                               36.5'
                   41.5'
                                               36.5'
                   46.51
            FREQ. RANGE 200-400 HHZ
                                               AT-197
Plate 30 - TX AHT AS-1018
                                       RX AHT
                                               3€.5'
                                       HEIGHT
            HEIGHT 36.5'
            HORZ. SEPARATION 6' - 8'
            FREQ. RANGE 200-400 MHz
                                                AS-1013
                                       RX AUT
Plate 31 - TX ANT AS-1018
                                                36.5'
                                       REIGHT
            hEIGHT 36.5'
                                                41.5
                    36.51
                                                46.5'
                    36.5'
                                                36.5'
                    41.51
                                                36.5'
                    46.5'
            FREQ. RANGE 200-400 MHz
                                                AS-1018
                                       RX ANT
 Plate 32 - TX ANT AS-1018
                                                36.54
                                       HEIGHT
             HEIGHT 36.5'
             HORZ. SEPARATION 6' - 8'
             FREQ. RANGE 200-400 MHZ
                                                AS-1097
                                        KX ANT
 Plate 33 - TX ANT AS-1018
                                                36.51
                                        HEIGHT
             HEIGHT 36.5'
                                                41.5'
                    36.5'
                                                46.5'
                    36.5'
                                                36.5'
                    41.51
                                                 36.5'
                     46.51
             FREQ. RANGE 200-400 MHz
                                                 AS-1097
                                        RX ANT
 Plate 34 - TX ANT AS-1016
                                                 36.51
                                        HEIGHT
             HEIGHT 36.5°
             HORZ. SEPARATION 6' - 6'
             FREQ. RANGE 200-400 MHz
                                                 AS-1181
                                        RX ANT
  Plate 35 - TX ANT AS-1018
                                                 36.5'
                                        HEIGHT
              HEIGHT 36.5'
                                                 41.5
                     36.5'
                                                 46.5'
                     3€.5'
                                                 36.5'
                     41.5'
                                                 36.51
                     46.5'
              FREQ. RANGE 200-400 MHz
```

4

三、 電影學者學者出出 西班牙工艺

"我就是我们是我们的一个一个

```
AS-1181
                                      RX ANT
Plate 36 - TX ANT AS-1018
                                               36.51
                                      HEIGHT
           HEIGHT 36.5'
           HORZ. SEPARATION 6' - 8'
           FREQ. RANGE 200-400 MHz
                                               AT-197
                                      RX AHT
Plate 37 - TX ANT AS-1097
                                               36.5'
                                       HEIGHT
            he IGHT 36.5'
                                               41.5'
                   36.5'
                                                46.5
                   36.5'
                                                36.5
                   41.5'
                                                36.5'
                   46.5'
            FREQ. RANGL 200-400 MHz
                                                AT-197
Plate 38 - TX ANT AS-1097
HEIGHT 36.5'
                                       RX ANT
                                                36.5
                                       HEIGHT
            HOPZ. SEPARATION 6' - 8'
            FREQ. RANGE 200-400 MHz
                                                AS-1018
                                       RX AUT
 Plate 39 - TX ANT AS-1097
                                                36.51
                                        HEIGHT
             HEIGHT 36.5'
                                                41.5'
                    36.5'
                                                46.5'
                    36.5'
                                                 36.51
                    41.5'
                                                 36.51
                    46.5'
             FREQ. RANGE 200-400 MHz
                                                 AS-1018
                                        RX ANT
 Plate 40 - TX AHT AS-1097
                                                 36.51
                                        HEIGHT
             HEIGHT 36.5'
             HORZ. SEPARATION 6' - 8'
             FREQ. RANGE 200-400 Miz
                                                 AS-1097
                                        RX ANT
             TX ANT AS-1097
  Plate 41
                                                 36.5'
                                        HEIGHT
             HEIGHT 36.5'
                                                 41.5'
                     36.51
                                                 46.51
                     36.5'
                                                 36.5'
                     41.5'
                                                 36.5'
                     46.51
              FREQ. RANGE 200-400 MHz
                                                 AS-1097
                                         RX ANT
  Plate 42 - TX ANT AS-1097
                                                  36.5
                                         HEIGHT
              MEIGHT 36.5'
              HORZ. SEPARATION 6' - 8'
              FREQ. RANGE 200-400 MHz
                                                  AS-1181
                                         RX ANT
   Plate 43 - TX ANT AS-1097
                                                  36.5'
                                         HEIGHT
              HEIGHT 36.5'
                                                  41.5'
                      36.5'
                                                  46.5'
                      36.5
                                                  36.51
                      41.5'
                                                  36.51
                      46.5'
               FREQ. RANGE 200-400 MHz
```

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```
AS-1181
                                      RX ANT
Plate 44 - TX ANT AS-1097
                                              36.51
                                      HEIGHT
           HEIGHT 36.5'
           HORZ. SEPARATION 6' - 5'
           FREQ. RANGE 200-400 MHZ
                                              AT-197
                                      RX ANT
Plate 45 - TX ANT AS-1101
                                              36.51
                                      HEIGHT
           HEIGHT 36.5'
                                              41.51
                   36.5
                                               46.51
                   36.51
                                               36.5'
                   41.51
                                               36.51
                   46.5
            FREQ. RANGE 100-200 MHz
                                               AT-197
                                      RX ANT
Plate 40 - TX ANT AS-1181
                                               30.5'
                                      HLIGHT
            HEIGHT 36.5'
            HORZ. SEPARATION 6' - 7' - 8'
           .FREQ. RANGE 100-200 MHz
                                               AS-1018
                                       RX ANT
Plate 47 - TX ANT AS-1161
                                               36.5'
                                       HEIGHT
            HEIGHT 36.5'
                                               41.5'
                    36.51
                                               46.51
                    36.5
                                               36.5'
                    41.5'
                                               36.5'
                    46.5'
            FREQ. RANGE 100-200 MHz
                                               AS-1018
                                       RX ANT
 Plate 48 - TX ANT AS-1181
                                                36.5'
                                       HEIGHT
             HEIGHT 36.5'
            HORZ. SEPARATION 6' - 7' - 8'
             FREQ. RANGE 100-200 MHz
                                                AS-1097
                                       RX ANT
 Plate 49 - TX ANT AS-1181
                                                36.51
                                       REIGHT
             HEIGHT 36.5'
                                                41.51
                    36.5'
                                                46.51
                    36.5
                                                36.5'
                    41.51
                                                36.5
                    46.51
             FREQ. RANGE 100-200 MHz
                                                1311-2A
                                        TIIA KS
 Plate 50 - TX ANT AS-1181
                                                36.51
                                        HEIGHT
             HEIGHT 36.5'
                                                41.51
                     36.5'
                                                46.5'
                     3€.5'
                                                36.5
                     41.5'
                                                36.5'
                     46.5
             FREQ. RANGE 100-200 MHz
                                                 AS-1131
  Plate 51 - TX AHT AS-1161
                                        RX ANT
                                               36.5'
                                        HEIGHT
              HEIGHT 36.5'
             HORZ. SEPARATION 6' - 7'
                                       - 3'
              FREQ. RANGE 100-200 MHz
```

TAK ... NAME

```
Plate 52 - TX ANT AS-1181
                                     RX ANT AT-197
                                              36.51
                                     HEIGHT
           HEIGHT 36.5'
                  36.5'
                                              41.51
                  36.5'
                                              46.5'
                  41.51
                                              36.51
                                              36.5'
                  46.51
           FREQ. RANGE 200-400 MHz
                                     RX ANT AT-197
Plate 53 - TX ANT AS-1161
                                     HEIGHT 36.5'
           HEIGHT BE.S!
           HORZ. SEPARATION 6' - 8'
           FREO. RANGE 200-400 MHz
Plate 54 - TX ANT AS-1187
                                     RX ANT
                                              AS-1018
                                              36.51
                                     HEIGHT
           HEIGHT 36.5'
                                              41.51
                   36.51
                   36.5'
                                              46.5'
                                              36.51
                   41.5'
                                              36.5'
                   46.51
           FREQ. RANGE 200-400 Mhz
Plate 55 - TX ANT AS-1181
                                      RX ANT AS-1018
           HEIGHT 36.5'
                                      HEIGHT 36.5'
           HORZ. SEPARATION 6' - 3'
           FREO. RANGE 200-400 Illiz
                                    - RX ANT AS-1097
Plate 56 - TX ANT AS-1181
            HEIGHT 36.5"
                                              36.5'
                                              41.51
                   36.51
                                              46.5'
                   36.51
                                              36.5'
                   41.5'
                                              36.51
                   46.5'
            FREQ. RANGE 200-400 Miz
                                      RX ANT AS-1097
Plate 57 - TX AGT AS-1181
            HEIGHT 36.5'
                                              36.5
                                      HEIGHT
            HORZ. SEPARATION €" - 8"
            FREO. RANGE 200-400 MHz
                                              AS-1181
                                      RX ANT
Plate 50 - TX ANT AS-1181
                                              36.5'
                                      HEIGHT
            HEIGHT 36.5'
                                              41.51
                   36.51
                                              46.5'
                   36.5'
                                               36.51
                   41.5'
                                               36.51
                   46.51
            FREQ. KAHGE 200-400 HHz
```

A Programme Co

Section III - Horizontal Separation of 20 Feet

明の時間はないではる。これの時間のないようで、とこれができるとは、他のできること

```
Plate 59 - TX ANT AT-197
                                       RX ANT
                                               AT-197
           HEIGHT 36.5'
                                       HEIGHT
                                               36.51
                   36.5'
                                               41.5'
                   36.51
                                               46.5
                                               36.51
                   41.5'
                   46.5°
                                               36.5'
            FREO. RANGE 200-400 MHz
Plate 60 - TX ANT AT-197
                                       RX ANT
                                               AS-1018
            HEIGHT 36.5'
                                       HEIGHT
                                               36.5'
                   36.51
                                                41.5'
                   36.51
                                               46.51
                   41.5'
                                                36.51
                   46.51
                                                36.5'
            FREO. RANGE 200-400 MHz
Plate 61 - TX ANT AT-197
                                       RX ANT
                                               AS-1097
            HEIGHT 36.5'
                                                36.5'
                                       HEIGHT
                                                41.5'
                   36.5'
                   36.5'
                                                46.51
                                                36.5'
                   41.5'
                   46.5
                                                36.51
            FREQ. RANGE 200-400 MHz
                                       RX ANT
                                                AS-1181
Plate 62 - TX ANT AT-197
            HEIGHT 36.5'
                                                36.5'
                                       HEIGHT
                   36.51
                                                41.5'
                   36.5'
                                                46.51
                                                36.5'
                   41.5'
                   46.5'
                                                36.51
            FREO. RANGE 200-400 MHz
Plate 63 - TX ANT AS-1018
                                       RX ANT
                                                AT-197
                                                36.51
            HEIGHT 36.5'
                                       HEIGHT
                   36.51
                                                41.51
                   36.5'
                                                46.5
                   41.5'
                                                36.5'
                                                36.5'
                   46.5'
            FREQ. RANGE 200-400 MHz
                                                AS-1018
Plate 64 - TX ANT AS-1018
                                       RX ANT
                                                36.51
            HEIGHT 36.5'
                                       HEIGHT
                   36.5'
                                                41.5'
                   36.51
                                                46.5'
                   41.5'
                                                36.51
                                                36.51
                   46.5'
            FREQ. RANGE 200-400 MHz
```

```
AS-1097
                                       RX ANT
Plate 65 - TX Aut AS-1018
                                                36.51
                                       HEIGHT
            HEIGHT 36.5'
                                                41.51
                    36.5'
                                                46.51
                    36.51
                                                36.51
                    41.5'
                                                36.5'
                    46.51
            FREQ. RANGE 200-400 MHz
                                                 AS-1181
                                        RX ANT
Plate 66 - TX AHT AS-1018
                                                 36.51
                                        HEIGHT
            HEIGHT 36.5'
                                                 41.5'
                    36.5'
                                                 46.51
                    36.51
                                                 36.5'
                    41.5'
                                                 36.5'
                    46.5'
            FREQ. RANGE 200-400 MHz
                                                 AT-197
                                        RX ANT
Plate 67 - TX ANT AS-1097
                                                 36.5'
                                        HEIGHT
             HEIGHT 36.5'
                                                 41.5'
                    36.5'
                                                 46.51
                    36.5'
                                                 36.51
                    41.5'
                                                 36.5'
                    46.5
             FREQ. RANGE 200-400 MHz
                                                  AS-1018
                                         RX ANT
 Plate 68 - TX ANT AS-1097
                                                  36.5'
                                         HE IGHT
             HEIGHT 36.5'
                                                  41.5'
                     36.5'
                                                  46.5
                     36.5'
                                                  36.5'
                     41.5'
                                                  36.5'
                     46,51
             FREQ. RANS: 200-400 MHz
                                         RX ANT
                                                  AS-1097
 Plate 69 - TX ANT AS-1097
                                                  36.5'
                                         HE IGHT
             HEIGHT 36.5'
                                                  41.5'
                     36.51
                                                  46.51
                     36.51
                                                  36.51
                     41.5'
                                                  36.5'
                     46.5'
              FREQ. RANGE 200-400 Mhz
                                                  AS-1181
                                         RX ANT
  Plate 70 - TX ANT AS-1097
                                                  36.5'
                                         HEIGHT
              HEIGHT 36.5'
                                                  41.5'
                      36.51
                                                   46.51
                      3€.51
                                                  36.51
                      41.5'
                                                   36.5'
                      46.5'
              FREQ. RANGE 200-400 MHz
                                                   AT-197
                                          RX ANT
  Plate 71 - TX ANT AS-1181
                                                   36.5'
                                          HEIGHT
              HEIGHT 36.5'
                                                   41.5'
                      36.5'
                                                   46.5'
                      36.5'
                                                   36.51
                      41.5'
                                                   36.5'
                      46.5
              FREQ. RANGE 200-400 HHz
```

Salah Canada Charles and Canada Canada

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```
RX ANT AS-1018
Plate 72 - TX ANT AS-1181
                                     HEIGHT
                                               36.5
           HEIGHT 36.5'
                                               41.5'
                   36.5'
                   36.51
                                               46.51
                                               36.5'
                   41.5'
                   46.5
                                               36.5'
            FREO. RANGE 200-400 MHz
                                       RX ANT AS-1097
Plate 73 - TX ANT AS-1181
                                               36.51
                                       HEIGHT
            HEIGHT 36.5'
                                               41.51
                   36.51
                                               46.51
                   36.5'
                                               36.5'
                   41.5'
                                               36.51
                   46.5'
            FREO. RANGE 200-400 MHz
                                       RX ANT AS-1181
Plate 74 - TX ANT AS-1181
                                       HEIGHT
                                               36.5'
            HEIGHT 36.5'
                                                41.54
                   36.5'
                   36.5'
                                                46.5
                                                36.5
                   41.51
                                                36.5'
                   46.5'
            FREQ. RANGE 200-400 MHz
Plate 75 - TX ANT AS-1181
                                       RX ANT AT-197
            HEIGHT 36.5'
                                       HEIGHT
                                               36.5
                   36.5'
                                                41.5'
                   36.5'
                                                46.5'
                   41.51
                                                36.5'
                   46.5'
                                                36.54
            FREO. RANGE 100-200 MHz
                                       RX ANT AS-1018
Plate 76 - TX ANT AS-1181
                                                36.5'
            HEIGHT 36.5'
                                       HEIGHT
                                                41.5'
                   36.54
                                                46.5'
                   36.5'
                                                36.5'
                   41.5'
                   46.5'
                                                36.5'
            FREQ. RANGE 100-200 MHz
                                       RX ANT AS-1097
Plate 77 - TX ANT AS-1181
            HEIGHT 36.5'
                                       HEIGHT
                                                36.5'
                                                41.5'
                   36.5'
                                                46.5'
                   36.5'
                                                36.5'
                   41.5'
                   46.5'
                                                36.5'
            FREO. RANGE 100-200 MHz
Plate 78 - TX ANT AS-1181
                                       RX ANT AS-1181
                                                36.5'
                                       HEIGHT
            HEIGHT 36.5'
                                                41.5'
                   36.51
                                                46.5'
                   36.51
                                                36.5'
                   41.5
                   46.5'
                                                36.5'
            FREQ. RANGE 100-200 Miz
```

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HEIGHT TX 36.5' RX 41.5' (1)

SINGLE POLE MEASUREMENTS

TX AN1 AT-197 RX ANT AT-197 (1)
AS-1018 (2)
AS-1097 (3)
AS-1181 (4)

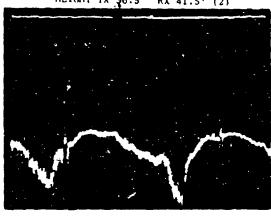
REC. PWR/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

FREQUENCY RANGE

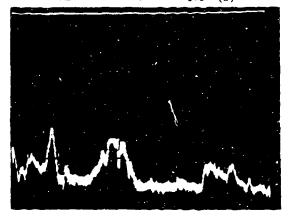
200-400 MHz

FREQUENCY SCALE

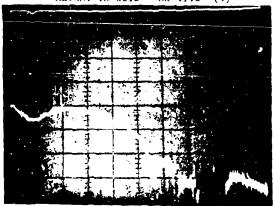
HEIGHT TX 36.5' RX 41.5' (2)

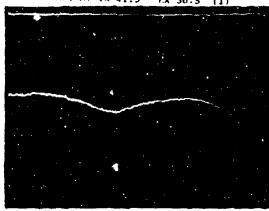


HEIGHT TX 36.5' RX 41.5' (3)



HEIGHT TX 36.5' RX 41.5' (4)





SINGLE POLE MEASUREMENTS
TX ANT AT-197 RX ANT AT-197 (1)

AS-1018 (2) AS-1097 (3)

45-1181 (4)

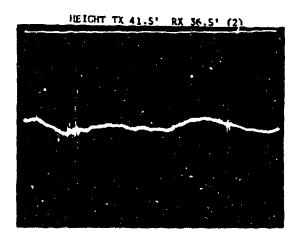
REC. PMR/GEN PMR 10 dB/CM BELOW ZERG REFERENCE LINE CABLE ATTM. ENCLUDED 5.0-7.7 dB

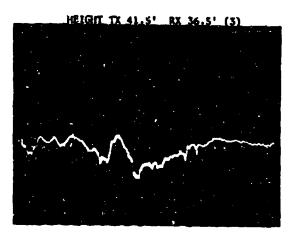
PREQUENCY RANGE

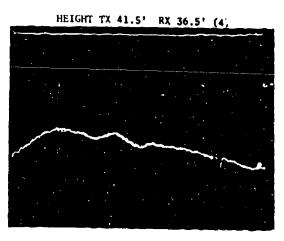
200-400 HEI2

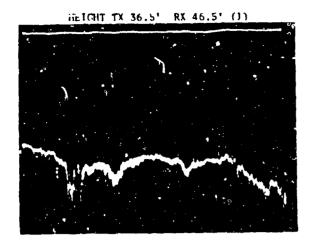
FREQUENCY SCALE

20 MHs/CN









SINGLE POLE MEASUREMENTS
TX ANT AT-197 RX ANT AT-197 (1)

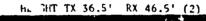
AS-1018 (2) AS-1097 (3) AS-1181 (4)

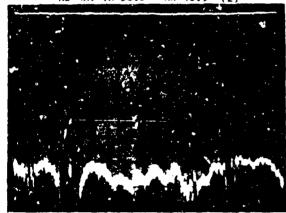
REC. PWR/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

FREQUENCY RANGE

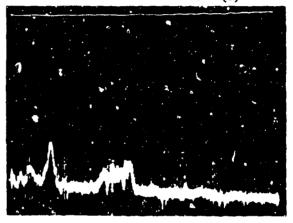
200-400 Miz

FREQUENCY SCALE

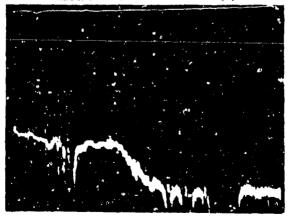


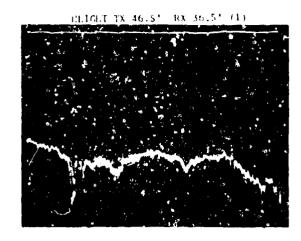


HEIGHT TX 36.5' RX 46.5' (3)



HEIGHT TX 36.5' RX 46.5' (4)





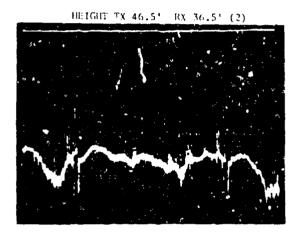
SINGLE POLE MEASUREMENTS TX ANT AT-197 RX ANT AT-197 (1)
AS-1018 (2)
AS-1097 (3)

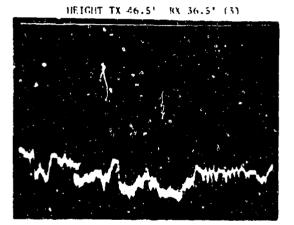
AS-1181 (4)

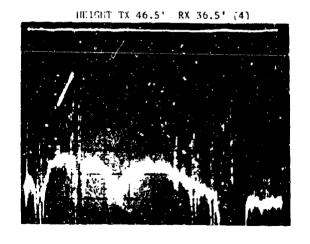
REC. PWR/GEN PWR 10 dB/CM BELOW ZERG REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

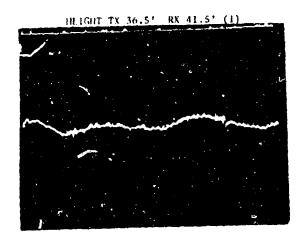
FREQUENCY RANGE 200-400 1812

FREQUENCY SCALE 20 MHz/CM



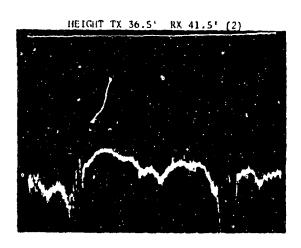


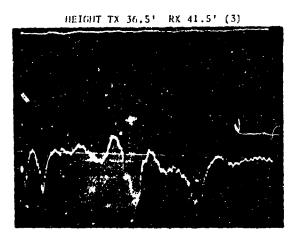


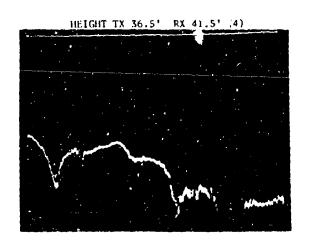


REC. PWR/GEN PWR 10 dB/CM BELOW TERO REFIRENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

FREQUENCY RANGE 200-400 MHz
FREQUENCY SCALE 20 MHz/CM





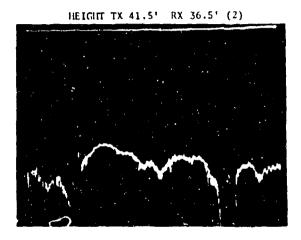


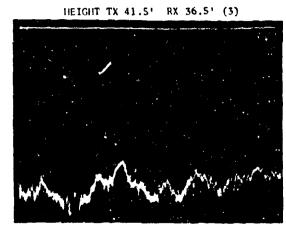
HEIGHT TX 41.5' RX 36.5' (1)

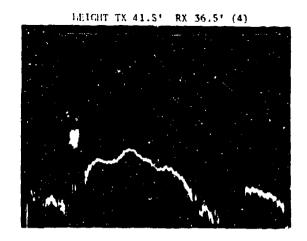
SINGLE POLL MEASUREMENTS
TX ANT AS-1018 RX ANT AT-197 (1)
AS-1018 (2)
AS-1097 (3)
AS-1181 (4)

REC. PWR/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

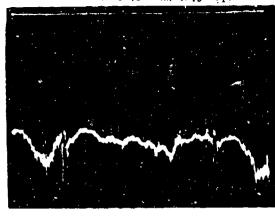
FREQUENCY RANGE 200-400 MHz
FREQUENCY SCALE 20 MHz/CM







USIGHT TX 36.51 RX 46.51 (1)



SINGLE POLL MEASUREMENTS TV ANT AS-1015 PM ANT AT-10" (1)

AS-1018 (2) AS-1097 (3)

45-1181 (4)

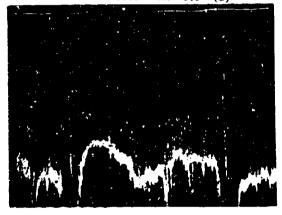
REC. PWR/GEN PWR 10 48/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.07-7.7 d8

FREQUENCY RANGE

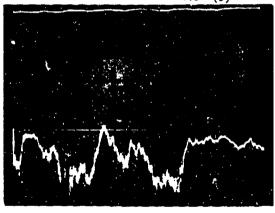
200-400 MHz

FREQUENCY SCALE 20 MHz/CM

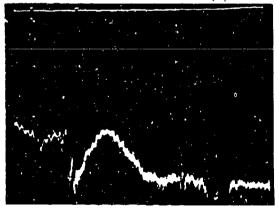
HEIGHT TX 36.5' RX 46.5' (2)



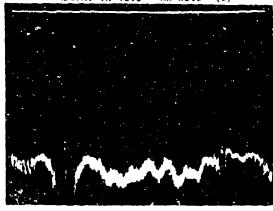
HEIGHT TX 36.5' RX 46.5' (3)



HEIGHT TX 36.5' RX 46.5' (4)



HEIGHT TX 46.5' RX 36.5' (1)



SINGLE POLE MEASUREMENTS TX ANT AS-1018 RX ANT AT-197 (1)
AS-1018 (2)
AS-1097 (3)
AS-1161 (4)

REC. PWR/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

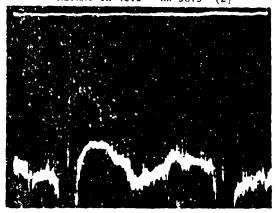
FREQUENCY RANGE

200-400 MHz

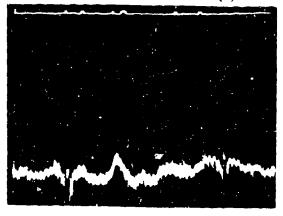
20 MHZ/CM

FREQUENCY SCALE

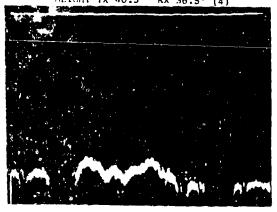
HEIGHT TX 46.5' RX 36.5' (2)



HEIGHT TX 46.5' RX 36.5' (3)



HEIGHT TX 46.5' RX 36.5' (4)



HEIGHT TX 36.5' RX 41.5' (1)



SINGLE POLE NEASUREMENTS
TX ANT AS-1097 RX ANT AT-197 (1)
AS-1012 (2)
AS-1097 (3)

AS-1181 (4)

REC. PWR/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED \$.0-7.7 dB

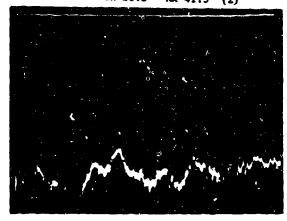
FREQUENCY RANGE

200-400 MHz

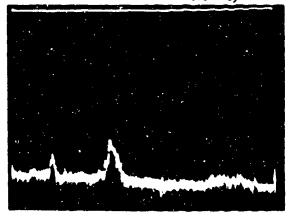
FREQUENCY SCALE

20 MH2/CH

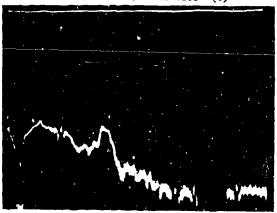
HEIGHT TX 36.5' RX 41.5' (2)

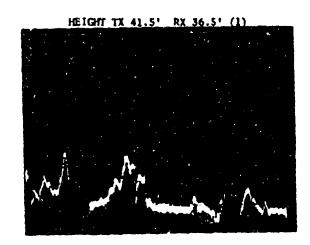


HEIGHT TX 36.5' RX 41.5' (3)



HEIGHT TX 36.5' RX 41.5' (4)





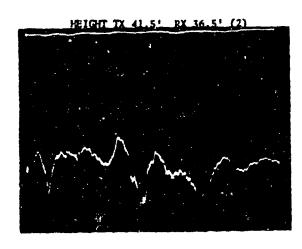
SINGLE POLE MEASUREMENTS TX ANT AS-1097 RX ANT AT-197 (1)
AS-1018 (2)
AS-1097 (3)
AS-1181 (4)

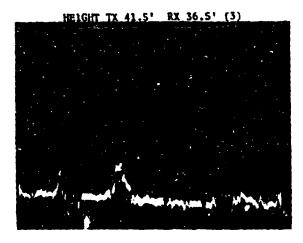
REC. PWR/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

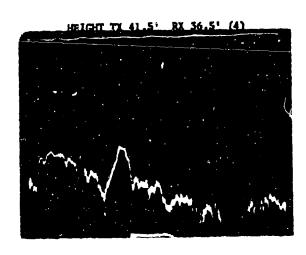
FREQUENCY RANGE

200-400 MHz

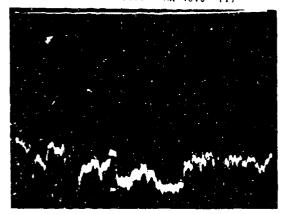
PREQUENCY SCALE







HEIGHT TX 36.5' RX 46.5' (1)



SINGLE POLE MEASUREMENTS
TX ANT AS-1097 RX ANT AT-197 (1)

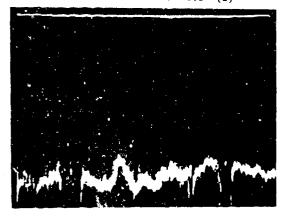
AS-1018 (2) AS-1097 (3) AS-1181 (4)

REC. PWR/GEN PWR 10.dB/CM BELOW DERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

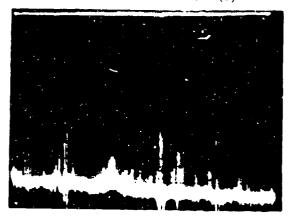
FREQUENCY RANGE 200-400 MHz

FREQUENCY SCALE 20 MHz/CM

HEIGHT TX 36.5' RX 46.5' (2)



HEIGHT TX 36.5' RX 46.5' (3)



HEIGHT TX 36.5' RX 46.5' (4)





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REC. PWR/GEN PWR 10 dB/CM BELOW ZERO
REFERENCE LINE
CABLE ATTN. INCLUDED 5.0-7.7 dB

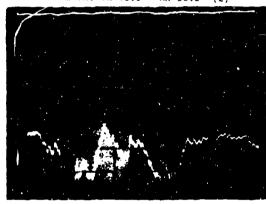
FREQUENCY RANGE

200-400 Miz

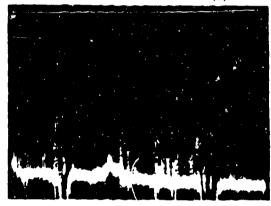
FREQUENCY SCALE

20 MHz/CM

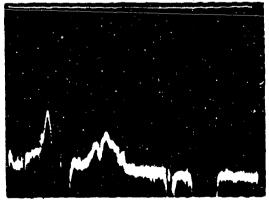
HEIGHT TX 46.5' RX 36.5' (2)



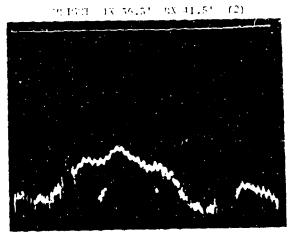
HEIGHT TX 46.5' RX 36.5' (3)



HEIGHT TX 46.5' RX 36.5' (4)



18 1607 15 56.51 DX 41.51 (T)

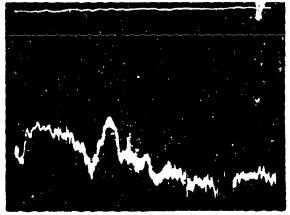


SINGLE POLICE NAME OF THE TAX AND ASSESSED BY A VIOLATION OF THE POLICE OF THE POLICE

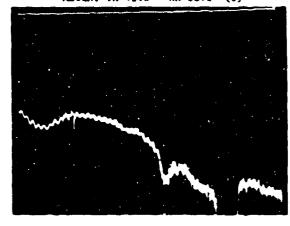
REC. PWR/GEN PWR
10 dB/CM RELOW TERO
RITERENCE LUNG
CABLE ATTN. INCLUDED 5.0-7.7 da

FREQUENCY RANGE 200-400 Mis FREQUENCY SCALE 20 MHz/CM

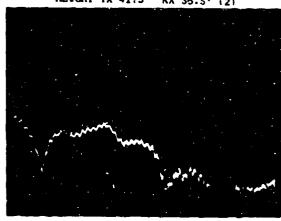
MEIGHT TX 36.5' FX 41.5' (3)



HEIGHT TX 41.5' RX 36.5' (1)



HEIGHT TX 41.5' RX 36.5' (2)



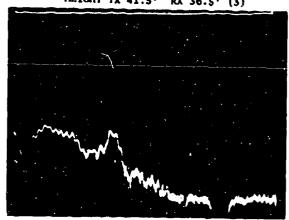
REC. PWR/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

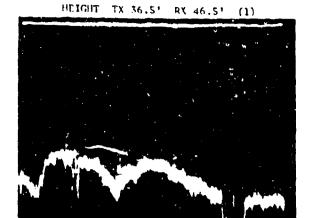
FREQUENC Y RANGE

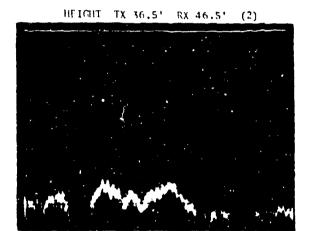
200-400 MHz

FREQUENCY SCALE

HEIGHT TX 41.5' RX 36.5' (3)

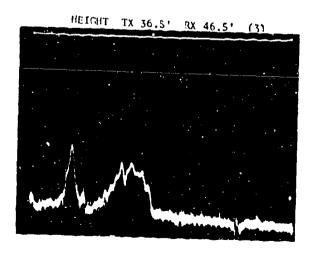


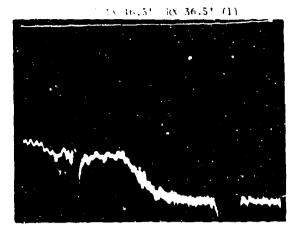


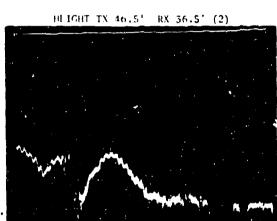


REC. PWR/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

FREQUENCY RANGE 200-400 M12
FREQUENCY SCALE 20 M12/CM



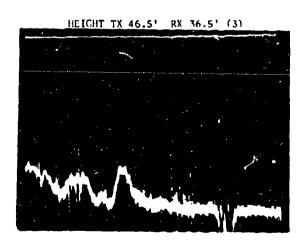




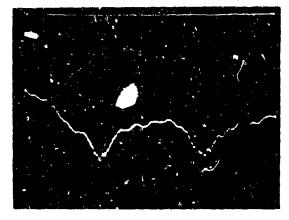
SINGLE POLE MEASUREMENTS
TX ANT AS-1181 RX ANT AT-197 (1)
AS-1018 (2)
AS-1097 (3)

REC. PWR/GEN PWR
10 dB/CM BELOW ZERO
REFERENCE LINE
CABLE ATTN. INCLUDED \$.0-7.7 dB

FREQUENCY RANGE 200-400 M1z
FREQUENCY SCALE 20 M1z/CM



MAGHIE TX 36.51 RX 41.51 (1)



SINGLE POLL MEASUREMENTS
TX ANT AG-1181 RX ANT AT-107 (1)

AS-1018 (2) AS-1007 (3)

AS-1181 (4)

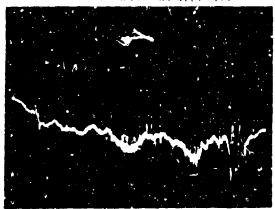
REC. PWR/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 3.46-4.74 dB

FREQUENCY RANGE

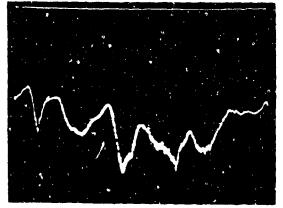
100-160 Miz

FREQUENCY SCALE

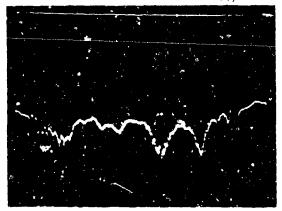
HEIGHT TX 36.51 RX 41.51 (2)



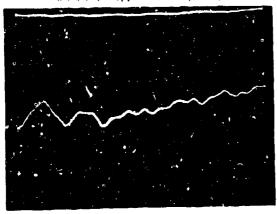
HEIGHT TX 36.5' RX 41.5' (3)



HEICHT TX 36.5' RX 41.5' (4)



94 (42 1) 41.51 (9) 37.51 (IV



SINGLE POLL MEASUREMENTS
TX ANT AS-1181 BX ANT MT-107 (1)
AS-1015 (2)

AS-100 (5) AS-1181 (1)

REC. PWR/GEN PWR 10 dB/CM BELOW DLRO REFERENCE LINE CABLE ATTN. INCLUDED 3.46-4.74 dB

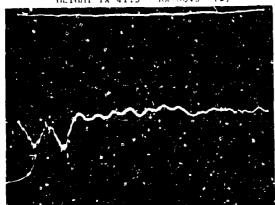
FREQUENCY RANGE

100-160 MHz

FREQUENCY SCALE

16 MHz/CM

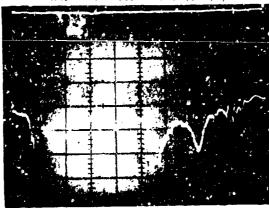
HEIGHT TX 41.5' RX 36.5' (2)



HELIGHT TX 11.5' DX 30.5' (3)



HEIGHT IX 41.5! RX 36.5' (4)



HE TOHT TX 56.51 -- X 16.51 (1)



SINGLE POLE MEASUREMENTS
TX ANT AS-1181 TX ANT AT-197 (1)

AS-1018 (2) AS-1097 (3)

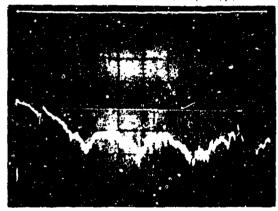
AS-1181 (4)

REC. PWR/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 3.36-4.74 dB

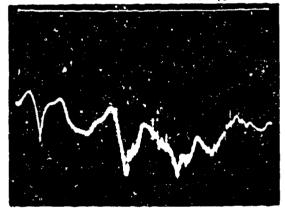
FREQUENCY RANGE 100-160 MHz

FREQUENCY SCALE 16 MHz/CM

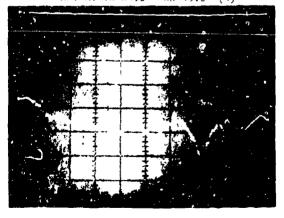
BEJOHT 3X 36.53 PX 46.63 (2)

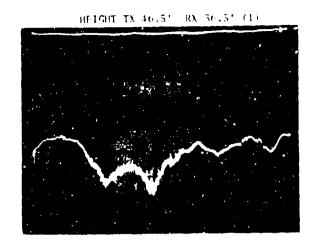


HEIGHT TX 36.5' RX 46.5' (3)



ill ICHI TX 36.5' RX 46.5" (4)





SINGLE POLE OF ASSESSED S TX ANT AS-1181 - BX ANT A1-197

AS-1018 (2) AS-1007 (3)

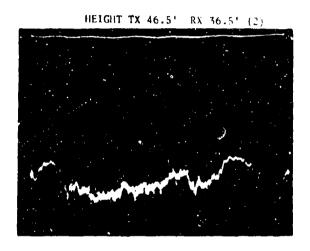
AS-1181 (4)

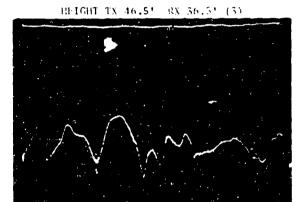
REC. PWR/GEN PWR 10 dB/CM BELOW TERO REFERENCE LINE CABLE ATTN. INCLUDED 3.46-4.74 dB

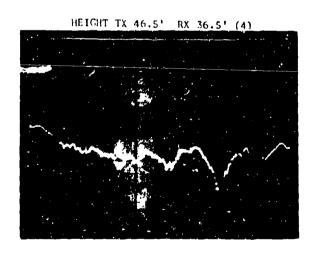
FREQUENCY RANGE

100-160 Miz

FREQUENCY SCALE





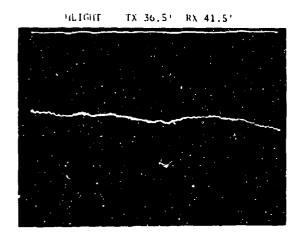


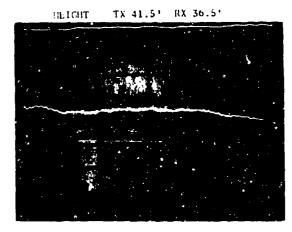
HEIGHT TX 36.5' RX 36.5'

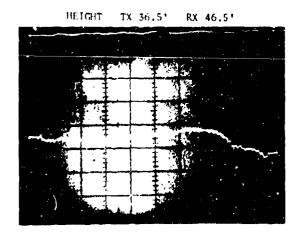
ANTENNA
TRANSMIT RECEIVE
AT-197 AT-197
HORZ. SEPARATION - 7 FT.

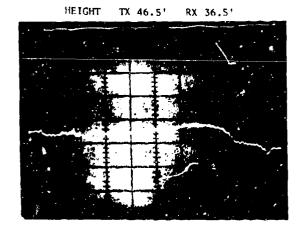
REC. PWR/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

FREQUENCY RANGE 200-400 MHz
FREQUENCY SCALE 20 MIz/CM









ANTENNA

TRANSMIT AT-197 RECEIVE AT-197

REC. PWR/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

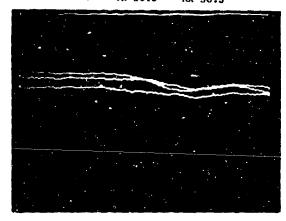
FREQUENCY RANGE

200-400 MHz

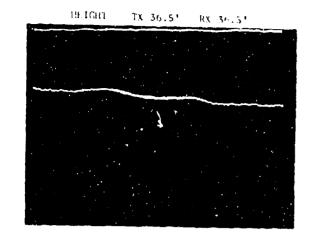
FREQUENCY SCALE

20 MHz/CM

HEIGHT TX 36.5' RX 36.5'



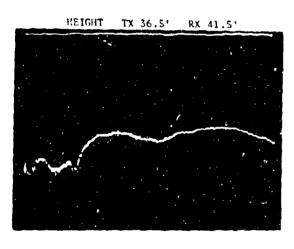
HORIZONTAL SEPARATION 6'-7'-8'

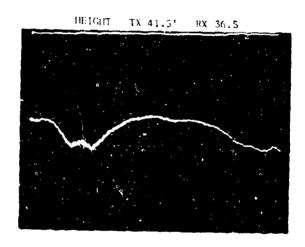


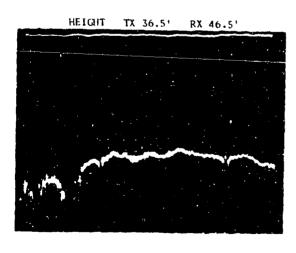
TRANSMIT RECEIVE AT -197 AS-1918
HORE, SEPARATION - 7 FT.

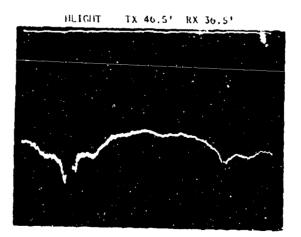
REC. PWR/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

FREQUENCY RANGE 200-400 MHz
FREQUENCY SCALE 20 MHz/CM









ANTENNA

TRANSMIT AT-197

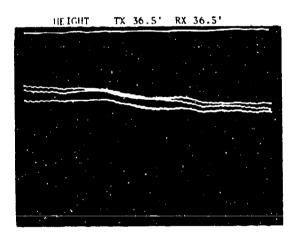
RECEIVE AS-1018

RIC. PWR/GEN PWP 10 JB/CM BELOW TERO REPERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

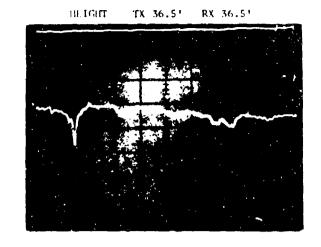
FREQUENCY RANGE

200-400 MHz

TREAD NOT SCALE



HORIZONTAL SEPARATION - 61-71-81



ANTENNA

TRANSMIT RECLIVE AT-197 HORZ, CHPARATION - 7 FT.

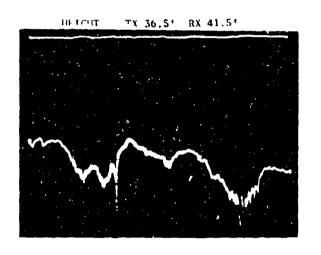
REC. PWR/GEN PWR 10 db/CM BFLOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

FREQUENCY RANGE

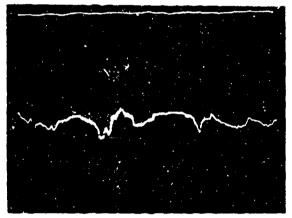
200-400 MHz

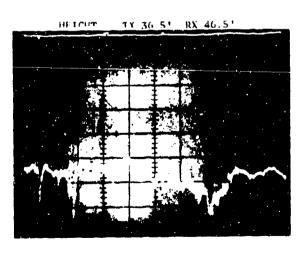
FREQUENCY SCALE

20 MHz/CM



UEIGHT TX 41.5 RX 36.51





HLIGHT TX 46.5' RX 36.5'

Con this has highly the

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ANTENNA

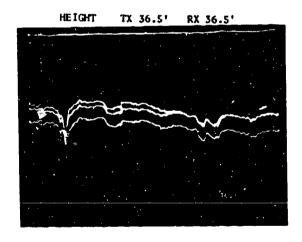
TRANSMIT AT-197 RECEIVE AS-1097

REC. PWR/GEN PWR
10 dB/CM BELOW ZERO
REFERENCE LINE
CABLE ATTN. INCLUDED 5.0-7.7 dB

FREQUENCY RANGE

200-400 MHz

FREQUENCY SCALE



HORIZONTAL SEPARATION - 6'-7'-8'

UE LOHT TX 36.51 RX 36.51

ANTENNA

TRANSMIT AT-197 RECLIVE AS-1181 HOR2. SEPARATION - 7 FT.

REC. PWR/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

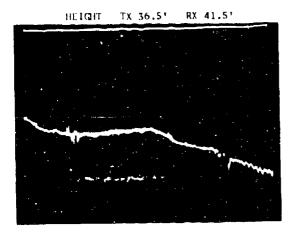
FREQUENCY RANGE

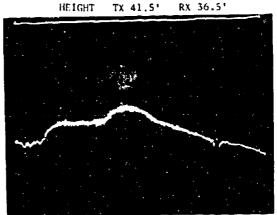
200-400 MHz

FREQUENCY SCALE

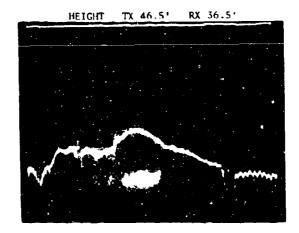


HEIGHT TX 41.5'





RX 46.5' HEIGHT TX 36.51



ANTENNA

TRANSMIT AT-197

RECEIVE AS-1181

REC. PWR/GEN PWR 10 dB/CM BELOW ZERG REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7,7 dB

FREQUENCY PANCE

200-400 MHz

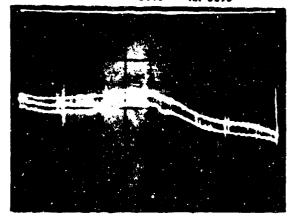
FREQUENCY SCALE

20 MHz/CM

HORIZONTAL SEPARATION - 6'

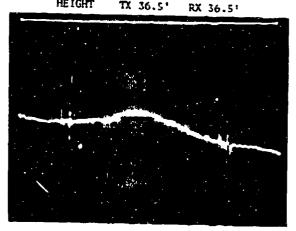
HEIGHT

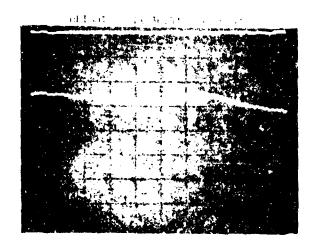
TX 36.5' RX 36.5'



HORIZONTAL SEPARATION - 8'

HE IGHT TX 36.5'





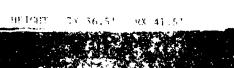
ANTENNA

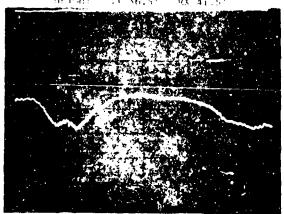
TRANSMIT RECEIVE AS-1018 AT-197 HORZ. SEPARATION - 7 FT.

BLC PWR/CLY PWD 10 di ZEM BILOW DERO DIFERNACE LINE CALLE ATEN. INCLUDED 5.0-7.7 38

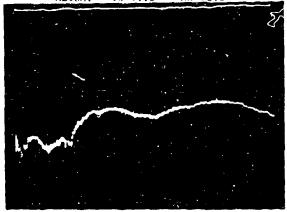
FREQUENCY RANGE 200-400 MHz

FREQUENCY SCALE 20 MH2/CM

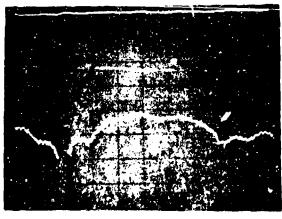




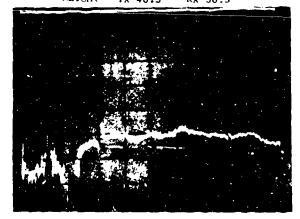
HEIGHT TX 41.5' RX 36.5'



HEIGHT TX 35.5' RX 46.5'



HEIGHT TX 46.5' RX 36.5'



TO THE WORLD BE SEEN TO SHARE

ANTENNA

TRANSMIT AS-1018

RECEIVE AT-197

REC. PWR/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

FREQUENCY RANGE

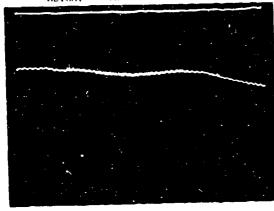
200-400 MHz

FREQUENCY SCALE

20 MHz/CM

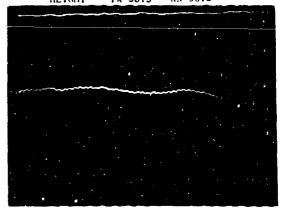
HORIZONTAL SEPARATION - 6'

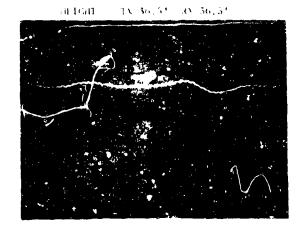
TX 36.5' RX 36.5' HEIGHT



HORIZONTAL SEPARATION - 8'

TX 36.51 RX 36.51 HE1GHT

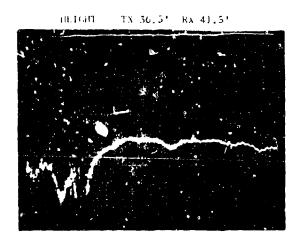


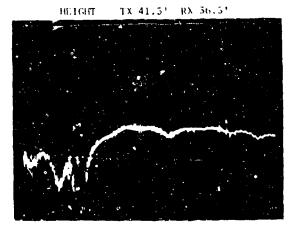


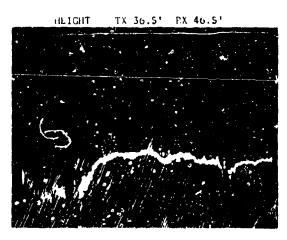
ANTENNA
TRANSMIT RECEIVE
AS-1018 AS-1018
HOR2. SEPARATION - 7 FT.

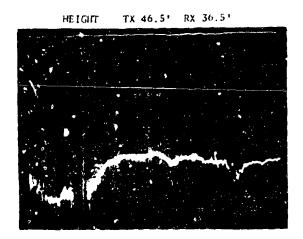
REC. PWR/GEN PWR 10 dF/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

FREQUENCY RANGE 200-400 MHz
FREQUENCY SCALE 20 MHz/CM









ANTENNA

TRANSMIT AS-1018

RECEIVE AS-1018

REC. PWR/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

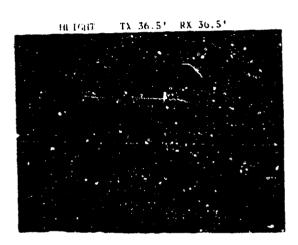
PREQUENCY RANGE

200-400 MHz

FREQUENCY SCALE

20 MHz/CM

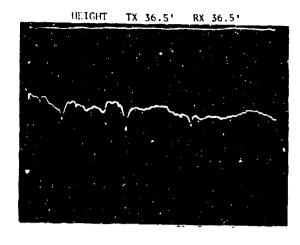
HORIZONTAL SEPARATION - 6'



HORIZONTAL SEPARATION - 8'

HEIGHT TX 36.5' RX 36.5'

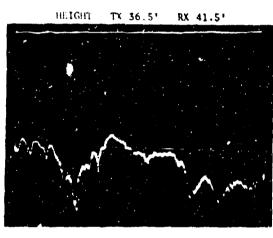


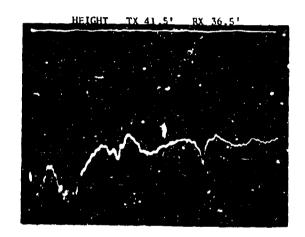


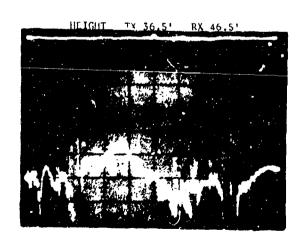
TRANSMIT RECEIVE AS-1018 AS-1097 HORZ. SEPARATION - 7 FT.

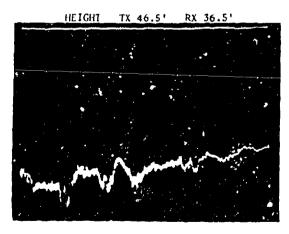
REC. PWR/GEN PWR 10 dB/CM BELOW ZERG REFERENCE LINE CABLE ATTN. INCLUDED 5.0~7.7 dB

FREQUENCY RANGE 200-400 MHz
FREQUENCY SCALE 20 MHz/CM









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TRANSMIT AS-1018

RECEIVE AS-1097

REC. PWR/GEN PWR
10 dB/CM BELOW ZERO
REFERENCE LINE
CABLE ATTN. INCLUDED 5.0-7.7 dB

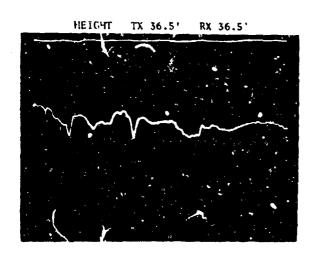
FREQUENCY RANGE

200-400 MHz

FREQUENCY SCALE

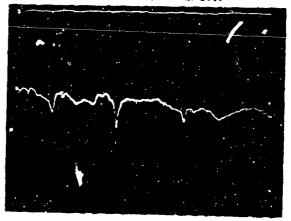
20 MHz/CM

HORIZONTAL SEPARATION - 6'



HORIZONTAL SEPARATION - 8'

HEIGHT TX 36.5' RX 36.5'



HEIGHT TX 36.5' RX 36.5'



ANTENNA

TRANSMIT RECEIVE AS-1018 AS-1181 HORZ. SEPARATION - 7 FT.

REC. PWR/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

FREQUENCY RANGE

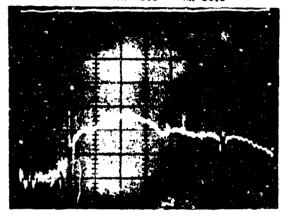
200-400 MHz

FREQUENCY SCALE 20 MHz/CM

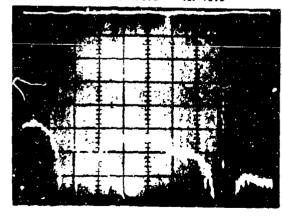
TX 36.5' RX 41.5' HEIGHT



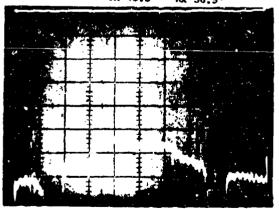
HE IGHT TX 41.5' RX 36.5'



HEIGHT TX 36.5 RX 46.51



HE IGHT TX 46.5' RX 36.5'



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(日本の)の機能を持つしている。 と世の場所を指するようにあるないのでは、経験はしている。

ANTENNA

TRANSMIT AS-1018 RECEIVE AS-1181

REC. PWR/GEN PWR
10 dB/CM BELOW ZERO
REFERENCE LINE
CABLE ATTN. INCLUDED 5.0-7.7 dB

FREQUENCY RANGE

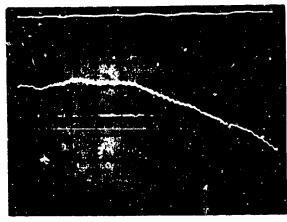
200-400 MHz

FREQUENCY SCALE

20 MHz/CM

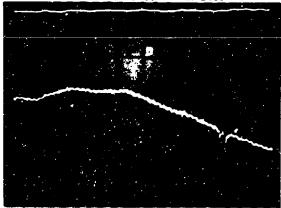
HORIZONTAL SEPARATION - 6'

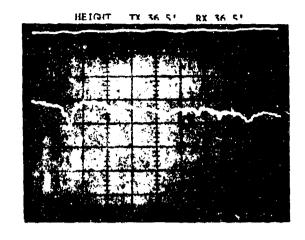
HEIGHT TX 36.5' RX 36.5'



HORIZONTAL SEPARATION - 8'

HEIGHT TX 36.5' RX 36.5'



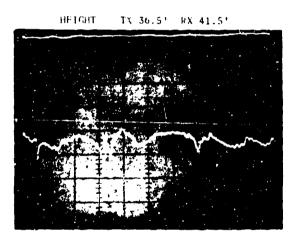


TRANSMIT RECEIVE AS-1097 AT-197 HORZ. SEPARATION - 7 FT.

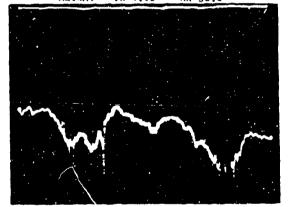
REC. PWR/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

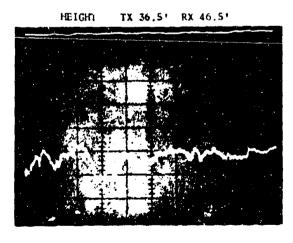
FREQUENCY RANGE 200-400 MHz

FREQUENCY SCALE 20 MHz/CM

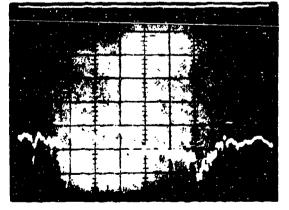


HEIGHT TX 41.5' RX 36.5'





HEIGHT TA 46.5' RX 36.5'



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ANTENNA

TRANSMIT AS-1097 RECEIVE AT-197

REC. PWK/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

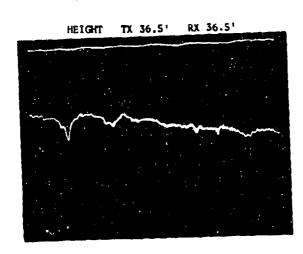
FREQUENCY RANGE

200-400 Miz

FREQUENCY SCALE

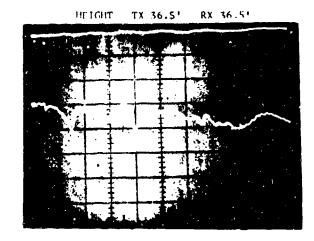
20 Miz/CM

HORIZONTAL SEPARATION - 6'



HORIZONTAL SEPARATION - 8'

HEIGHT TX 36.5' RX 36.5'



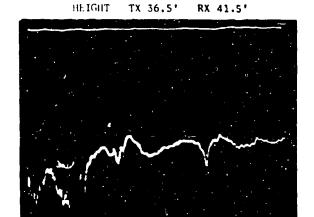
TRANSMIT RECEIVE AS-1097 AS-1018 HORZ. SEPARTION - 7 F.T

REC. PWR/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

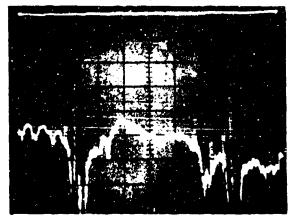
FREQUENCY RANGE

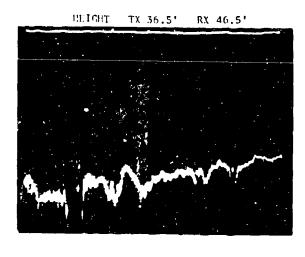
200-400 MHz

FREQUENCY SCALE 20 MHz/CM



HETCHT TX 41.5' RX 36.5'





HEIGHT RX 36.5' TX 46.51

TRANSMIT AS-1097 RECEIVE AS-1018

REC. PWR/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

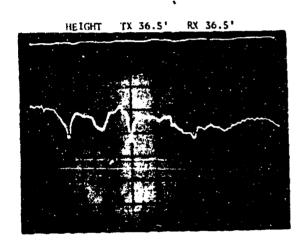
FREQUENCY RANGE

200-400 MHz

FREQUENCY SCALE

20 MH2/CM

HORIZONTAL SEPARATION - 6'



HORIZONTAL SEPARATION - 8'

HEIGHT TX 36.5' RX 36.5'

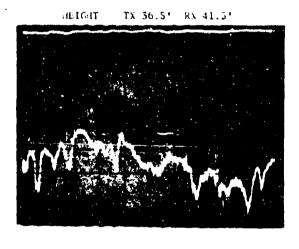
BEIGHT TX 36.51 rx 36.51

TRANSMIT RECFIVE AS-1097 AS-1097 HORE. SEPARATION - 7 FT.

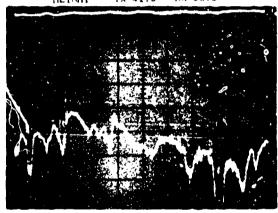
REC. PWR/GEN PWR
10 dB/CM BELOW ZERO
REFERENCE LINE
CABLE ATTN. INCLUDED 5.0-7.7 dB

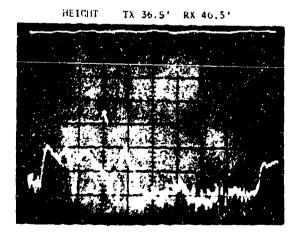
FREQUENCY RANGE 200-400 MIZ

FREQUENCY SCALE 20 MHz/CM



HEIGHT TX 41.3' RX 36.5'





HEIGHT TX 46.5' RX 36.5'

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ANTENNA

TRANSMIT AS-1097 RECEIVE AS-1097

REC. PWR/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

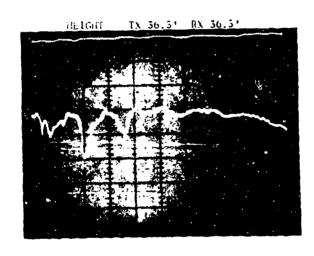
FREQUENCY RANGE

200-400 MHz

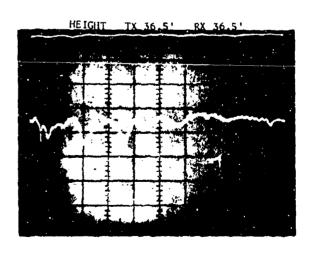
FREQUENCY SCALE

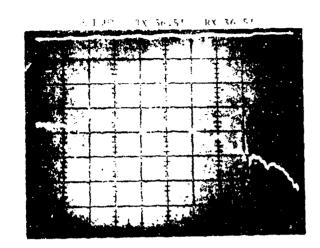
20 MHz/CM

HORIZONTAL SEPARATION - 6'



HORIZONTAL SEPARATION - 8'





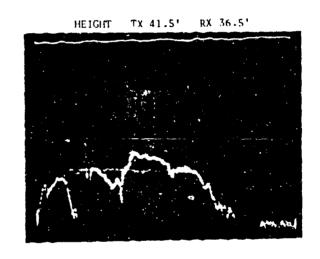
ANTIONA
TRANSMIT RECEIVE
AS 11917 AS-1181
1000. SEPARATION - 7 FT.

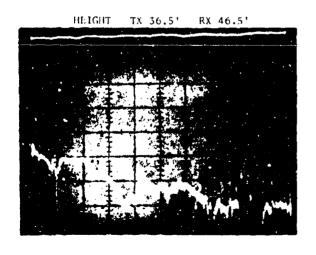
REC. PWR/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

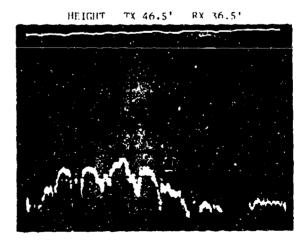
TREQUENCY RANGE 200-400 MHz

20 MHz/CM

FREQUENCY SCALE







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ANTENNA

TRANSMIT AS-1097

RECEIVE AS-1181

REC. PWR/GEN PWR
10 dB/CM BELOW ZERO
REFERENCE LINE
CABLE ATTN. INCLUDED \$.0-7.7 dB

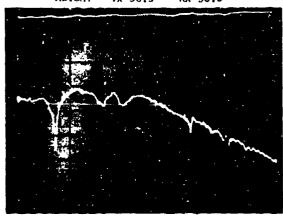
FREQUENCY RANGE

200-490 MHz

FREQUENCY SCALE 20 MHz/CM

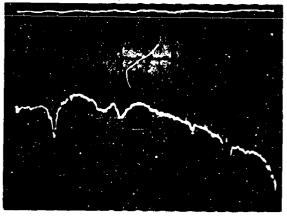
HORIZONTAL SEPARATION - 61

HEIGHT TX 36.5' RX 36.5'

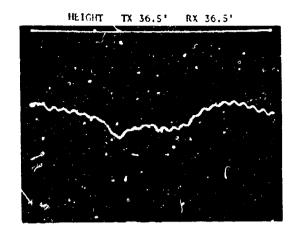


HORIZONTAL SEPARATION - R'

HEIGHT TX 36.5' RX 36.5'



Mary Walter

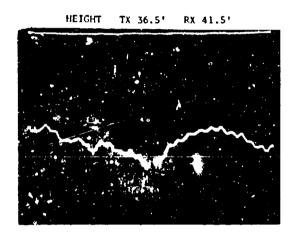


ANTENNA

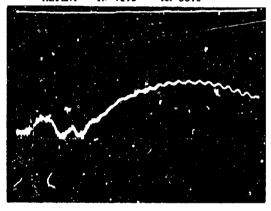
TRANSPIT RECEIVE AS-1181 AT-197 HORZ. SEPARATION - 7 FT.

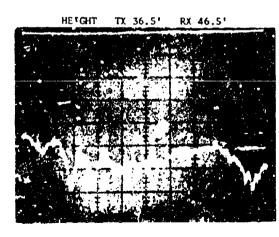
REC. PWR/GEN. PWR 10de/cm Below Zero REFERENCE LINE CABLE ATTN. INCLUDED 3.4-5.0 dB

rREQUENCY RANGE 100-200 MHz
FREQUENCY SCALE 10 MHz/CM



HEIGHT TX 41.5' RX 36.5'





HEIGHT T: 46.5' RX 36.5'

TRANSMIT AS-1181 RECEIVE AT-197

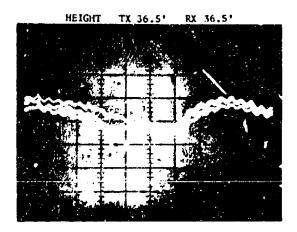
REC. PWR/GEN. PWR 10dB/CM BELOW ZERO REFERENCE LINE CABLE ATTH. INCLUDED 3.4~5.0 dB

FREQUENCY FANGE

100-200 MHz

FREQUENCY SCALE

10 MHz/CM



HORIZONTAL SEPARATION - 6'-7'-8'

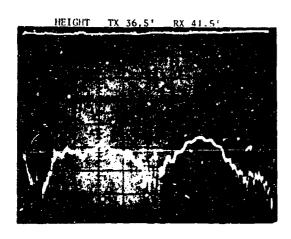
ANTENNA TRANSMIT AS-1101 RECUIVI AS-1181 AS-1018 HORZ, SUPARATION - 7 FT.

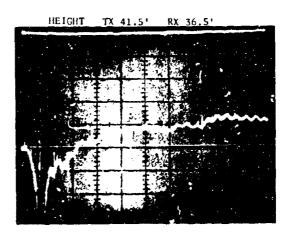
REC. PWK/GEN. PWR 10db/CM BELOW ZERO REFERENCE LINE CABLE ATIN. INCLUDED 3.4-5.0 db

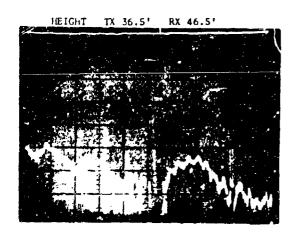
FREQUENCY RANGE

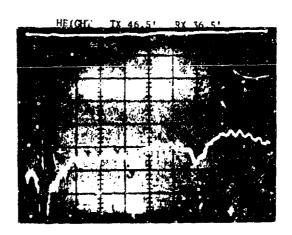
100-200 MIZ

FREQUENCY SCALE 10 MHz/MC









TRANSMIT AS-1181 RECEIVE AS-1018

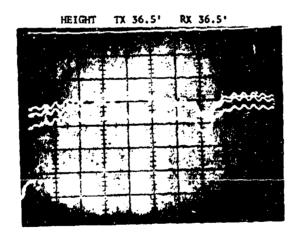
REC. PWR/GEN. PWR 10dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 3.4-5.0 dB

PREQUENCY RANGE

100-200 Miz

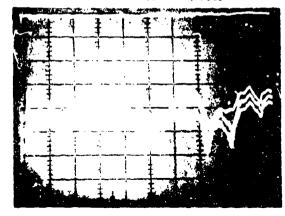
FREQUENCY SCALE

10 MHz/CM



HORIZONTAL SEPARATION - 6'-7'-8'

H 1Gh1 TV 36.5' RX 36.5'

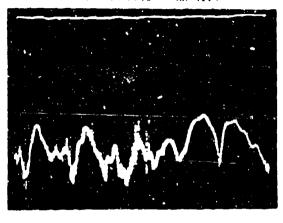


ANTENNA
TRANSMIT RECLIVE
AS-11*1 AS-1097
HORZ, SEPARATION - 7 FT.

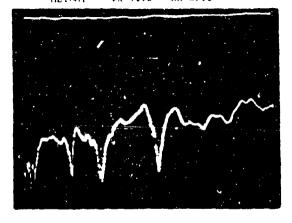
REC. PWR/GEN. PWR 10dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 3.4-5.0 dB

FREQUENCY RANGE 100-200 MHz
FREQUENCY SCALE 10 MHz/CM

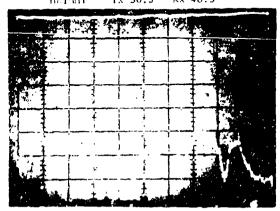
MELIGHT TX 36.5' RX 41.5'



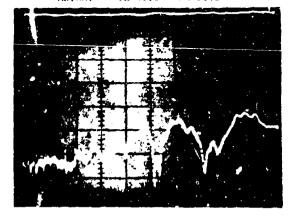
HEIGHT TX 41.51 RX 36.51

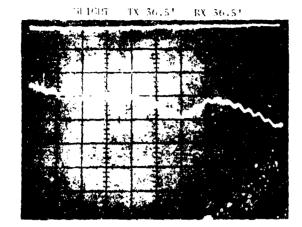


HEIGHT TX 36.51 RX 46.51



HEIGHT TX 46.51 RX 36.51

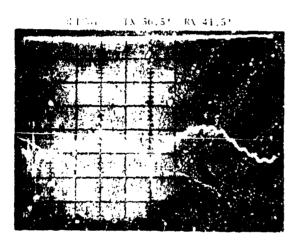


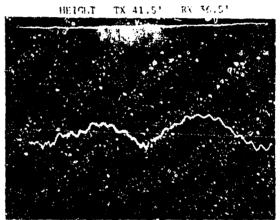


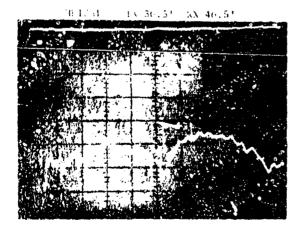
ANTENNA
TRANSMIT RECEIVE
AS-1181 AS-1181
HORZ. SEPARATION - 7 FT.

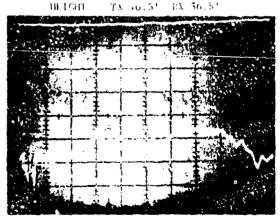
REC. PURYCEN PER 10 dR/CM BELOW SERO PLEERINGE LINE CASES ATTN. INCLUDED 3,4-5.0 UR

FREQUENCY RANGE 100-200 MHz
FREQUENCY SCALE 10 MHz/CM









TRANSMIT AS-1181 RECEIVE AS-1181

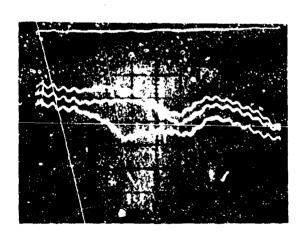
REC. PWR/GEN PWR 10 dP/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 3.4-5.0 dB

FREQUENCY RANGE

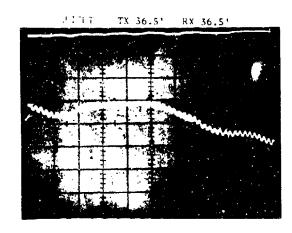
100-200 MHZ

FREQUENCY SCALE

10 MHZ/CM



HORIZGNTAL SEPARATION - 6'-7'-8'



TRANSMIT RECEIVE AS-1181 AT-197 HORZ. SEPARATION - 7 FT.

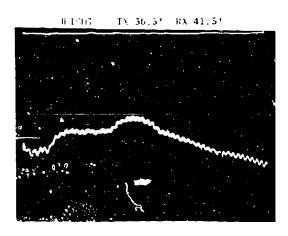
REC. PWR/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

FREQUENCY RANGE

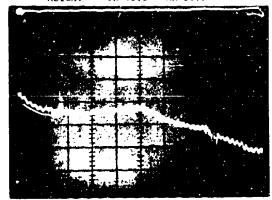
200-400 MHz

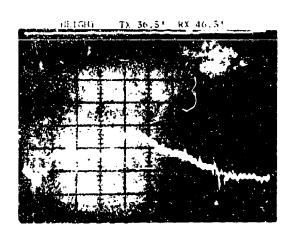
FREQUENCY SCALE

20 MHz/CM



HEIGHT TX 41.5' RX 36.5'





HEIGHT TX 46.5' RX 36.5'

TRANSMIT AS-1181

RECEIVE AT-197

REG. PWR/GEN PWR
10 dB/CM BELOW ZERO
REFERENCE LINE
CABLE ATTN. INCLUDED 5.0-7.7 dB

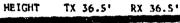
FREQUENCY RANGE

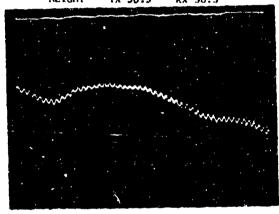
200-400 MHz

FREQUENCY SCALE

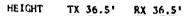
20 MHz/CM

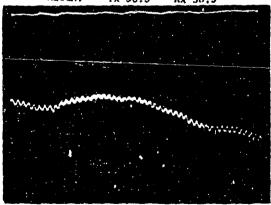
HORIZONTAL SEPARATION - 6'





HORIZONTAL SEPARATION - 8'



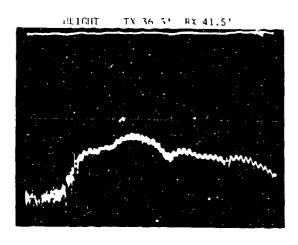


ANTENNA R

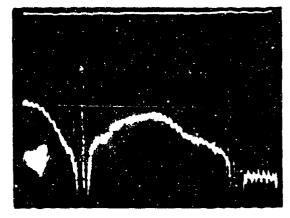
TRANSMIT RECEIVE AS-1181 AS-1018 INCR. SEPARATION - 7 FT.

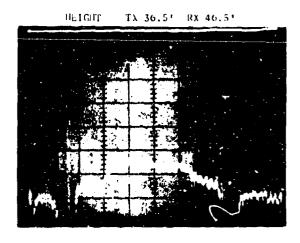
REC. PWR/GEN PWR
10 dB/CM BELOW ZERO
REFERENCE LINE
CABLE ATTN. INCLUDED 5.0-7.7 dB

FREQUENCY RANGE 200-400 MIZ
FREQUENCY SCALE 20 MHz/CM



HEIGHT TX 41.51 RX 36.51





HEIGHT TX 46.5' RX 36.5'



TRANSMIT AS-1181 RECEIVE AS-1018

REC. PWR/GEN PWR
10 dB/CH BELOW ZERO
REFERENCE LINE
CABLE ATTN. INCLUDED 5.0-7.7 dB

FREQUENCY RANGE

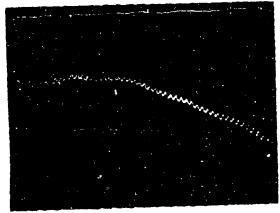
200-400 MHz

FREQUENCY SCALE

20 MHz/CM

HORIZONTAL SEPARATION - 6'

HEIGHT TX 36.5' RX 36.5'



HORIZONTAL SEPARATION - 8'

HEIGHT TX 36.5' RX 36.5'

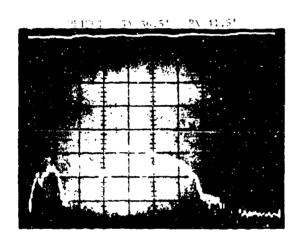
TRANSMII RECEIVE AS-1181 AS-1097 HORZ, SLPARATION - 7 FT.

REC. PWR/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN, INCLUDED 5-0-7.7 dB

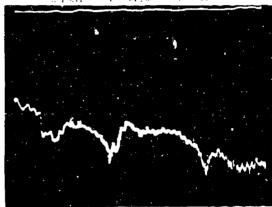
FREQUENCY RANGE

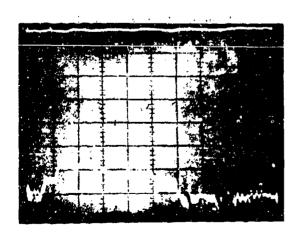
200-400 5912

FREQUENCY SCALE 20 MHz/CM



18 41.51 1 36.51





antenna

TRANSMIT AS-1181 RECEIVE AS-1097

REC. PWR/GEN PWR
10 dB/CM BELOW ZERO
REFERENCE LINE
CABLE ATTN. INCLUDED 5.0-7.7 dB

PREQUENCY RANGE

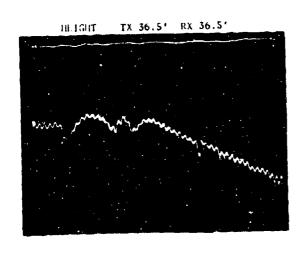
200-400 MHz

FREQUENCY SCALE

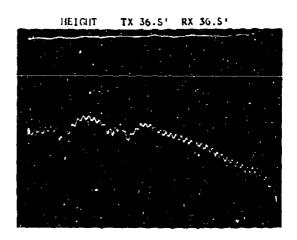
20 MHz/CM

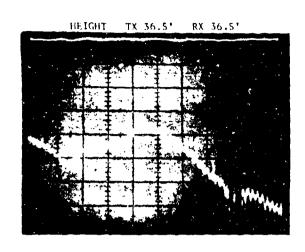
HORIZONTAL SEPARATION - 6'

AND THE PERSON OF THE PERSON O



HORIZONTAL SEPARATION - 8'





TRANSMIT RECEIVE AS-1181 AS-1181 HOR2. SEPARATION - 7 FT.

REC. PWR/GEN PWR 10 dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN, INCLUDED 5.0-7.7 dB

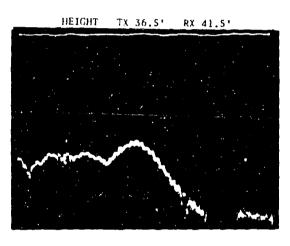
FREQUENCY RANGE

200-400 Miz

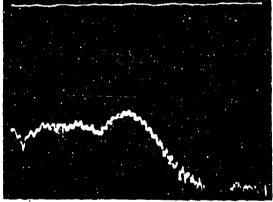
FREQUENCY SCALE

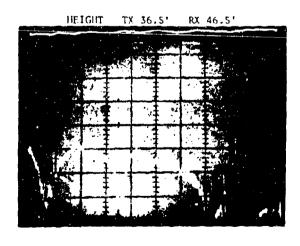
HE IGHT

20 Miz/CM



dETCHT TX 41.5' RX 36.5'





TY 46.5'

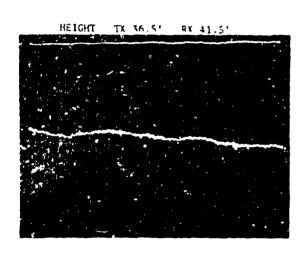
RX 36.5'

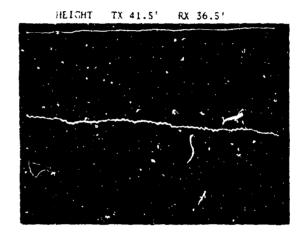
HI IGHT TX 36.5' RX 36.5'

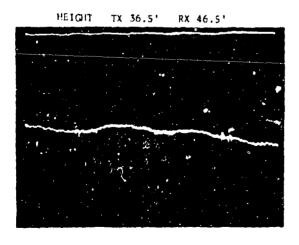
ANTENNA
TRANSMIT RECEIVE
AT-197 AT-197
HORI, SEPARATION - 20 FT.

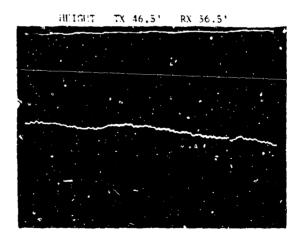
REC. PWR/GER PVR 10 dE/CM DELOW ZEPO REFERENCE LINE CADLE ATTN. INCLUDED 5.0-7.7 du

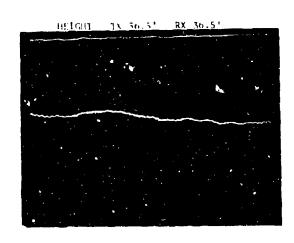
FREQUENCY RANGE 200-400 MHz
FREQUENCY SCALE 20 MHZ/CM











TRANSMIT RECEIVE AT-197 AS-1018 HORZ, SEPARATION - 20 FT.

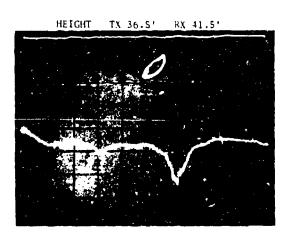
REC. PURZGEN PWR 10 db/CM JELOJ ZERO REFERENCE LINE CASLE ATTN. INCLUDED 5.0-7.7 ds

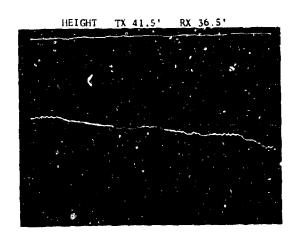
FREQUENCY PANGE

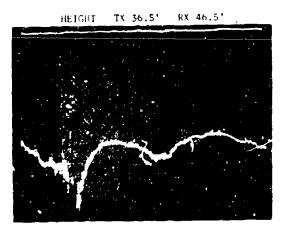
250-450 Mr.z

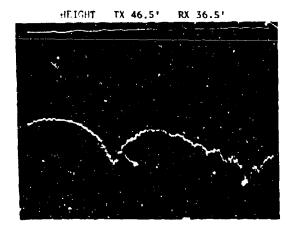
FREQUE ICY SCALE

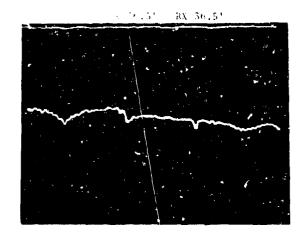
20 MHz/CM











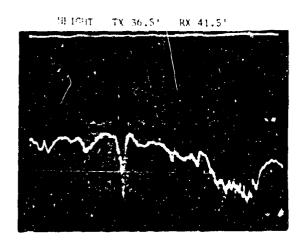
ANTENNA TRANSMIT AT-107 RECEIVE AT-197 AS-1097 HORZ. SEPARATION - 20 FT.

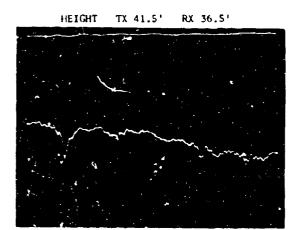
REC. PWR/GEN PWR 10 JU/CH RELOW ZERO REFERENCE LIVE CABLE ATTN. INCLUDED 5.0-7.7 dB

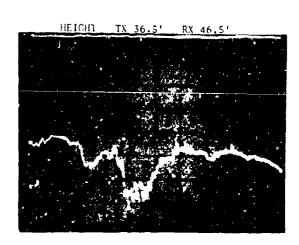
FREQUENCY PANGE

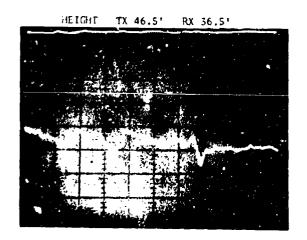
200-400 MHz

FREQUENCY SCALE 20 MHZ/CM

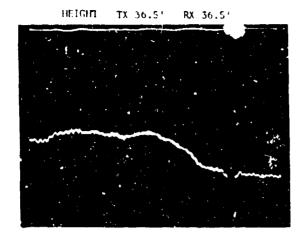








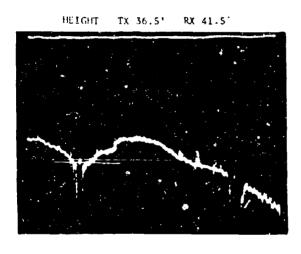
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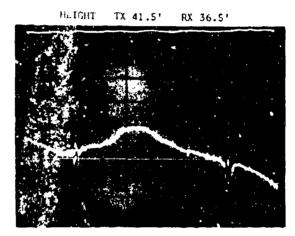


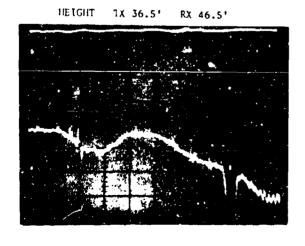
ANTENNA
TRANSMIT RECEIVE
AT 197 AS-1181
HORZ. DEPARATION - 20 FT

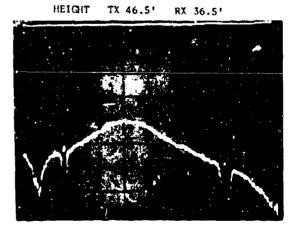
REC. PWR/GEN PWR 10 db/cm below zero REFERENCE LINE CABLE ATTH. INCLUDED 5.0-7.7 dB

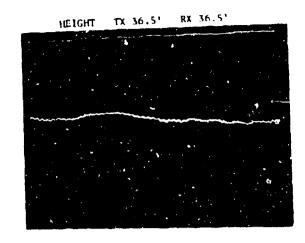
FREQUENCY RANGE 200-400 Myz
FREQUENCY SCALE 20 MHZ/CM









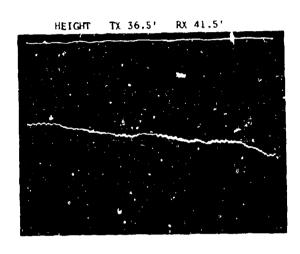


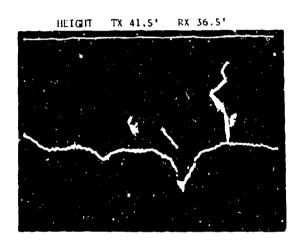
TRANSIT RECEIVE AS-1018 A:-197 HORIZ. SEPARATION - 20 FT.

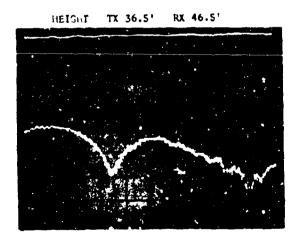
63

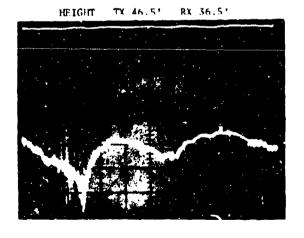
REC. PWR/CER PWN 10 de/cm Sélow ZERO REFERENCE LINE CABLE ATTN, INCLUDED 5.0-7.7 db

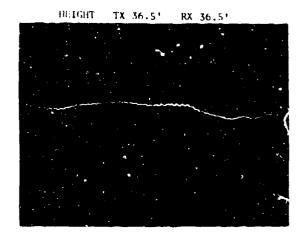
FREQUENCY RANGE 200-400 MHz
FREQUENCY SCALE 20 MHz/CM











ANTENNA
RECEIVE
AS-1018 AS-1018
HORZ. SEPARATION - 20 FT.

REC. PWR/GLN PWR 10 dB/CM BELOW ZERO REFERENCE LIME CABLE ATTN. INCLUDED 5.0-7.7 dB

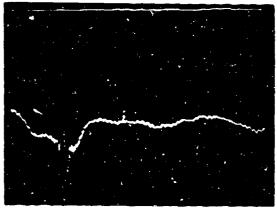
FREQUENCY RANGE

200-400 MHZ

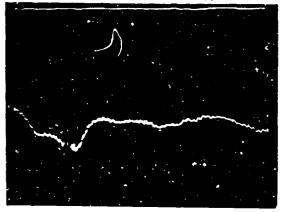
FREQUENCY SCALE

20 MHz/CH

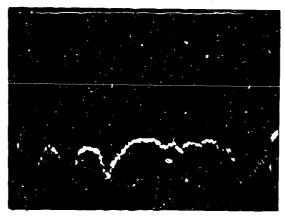
HEIGHT TX 36.5' RX 41.5'



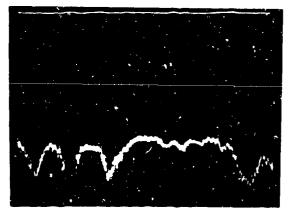
HEIGHT TX 41.5' RX 36.5'

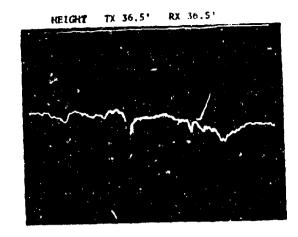


HEIGHT TX 36.5' RX 46.5'



HEIGHT TX 46.5' RX 36.5'





ANTENNA
TRANSIT RECEIVE
AS-1018 AS-1097
HORZ. SEPARATION - 20 FT.

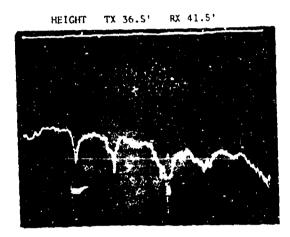
REC. PWR/GEN PWR 10 d6/CM BELOW ZERO REFERENCE LINE CABLE ATTH. +NCLUDED 5.0~7.7 do

FREQUENCY RANGE 2

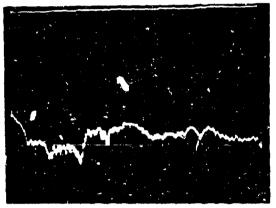
200-400 Mhz

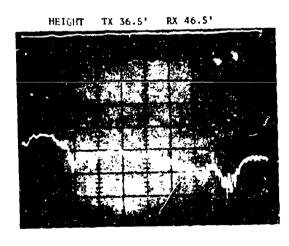
FREQUENCY SCALE

26 Miz/CH

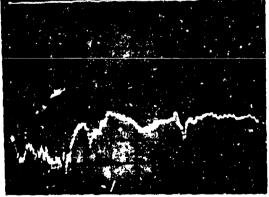


HILIGHT TX 41.5' RX 36.5'





HEIGHT TX 46.5' RX 36.5'



TRANSIT RECEIVE AS-1018 HORZ. SEPARATION - 20 FT.

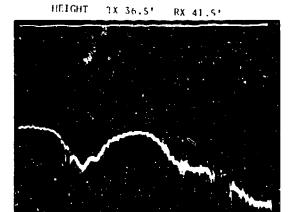
REC. PVR/CEN PUR 10 db/CM below zero REFERENCE LIVE CABLE ATTH. INCLUDED 5.0-7.7 db

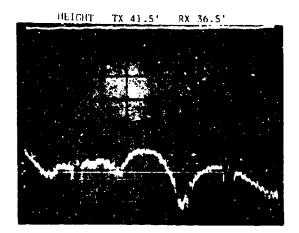
FREDUENCY RANGE

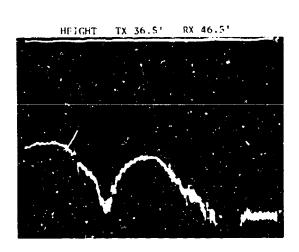
200-400 M.Z

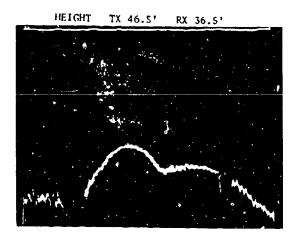
FREQUENCY SCALE

20 MHz/CM









TRANSMIT RECEIVE AS-1097 AT-197 HORZ. SEPARATION - 20 FT.

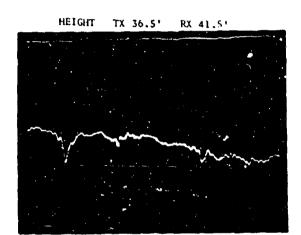
REC. PWR/GEN PWR TO dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 dB

FREQUENCY RANGE

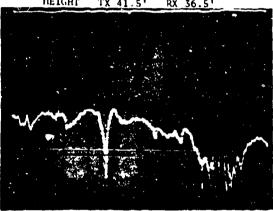
200-400 MHZ

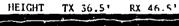
FREQUENCY SCALE

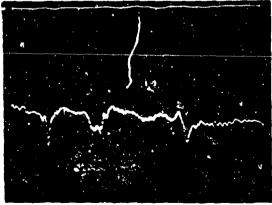
20 MHz/CM



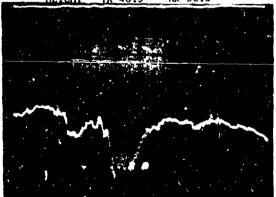
HEIGHT TX 41.5' RX 36.51

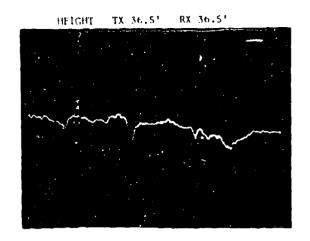






HEIGHT TX 46.5' RX 36.5'





ANTENNA
TRANSMIT RECEIV
AS-1097 AS-1018
HORZ, SEPARATION - 20 FT.

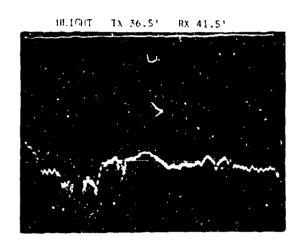
REC. PUR/GEN PWR TO db/CM BELOW ZERO REFERENCE LINE CARLE ATTA. INCLUDED 5.0-7.7 db

FREQUEITCY RANGE

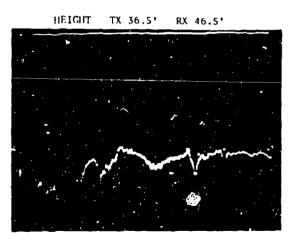
200-400 Minz

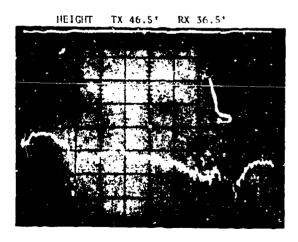
FREQUENCY SCALE

20 MHZ/CM



HEIGHT TX 41.5' RX 36.5'





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RECEIVE TRANSMIT AS-1097 AS-1097 HORZ, SEPARATION - 20 FT.

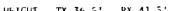
REC. PWR/GER PWF 10 db/cm & Low ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.3-7.7 de

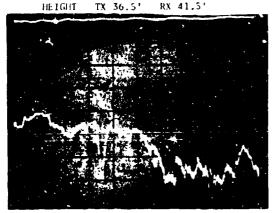
FREDUENCY RAWGE

200-400 Mis

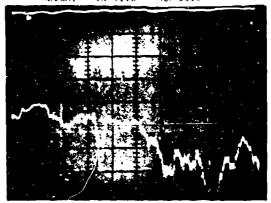
FPERUENCY SCALE

20 MHZ/CM

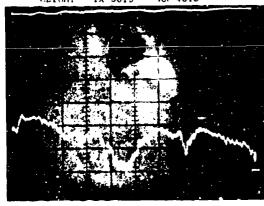




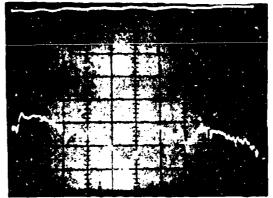
HEIGHT TX 41.5" RX 36.51

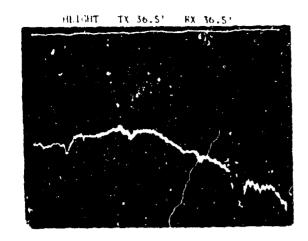


HEIGHT TX 36.5' RX 46.51



HEIGHT TX 46.5' RX 36.5'





A511.NNA
TRANSMIT RECEIVE
AS-1097 AS-1181
HORZ. SEPARATION - 20 FT.

REC. PUR/GET PAR

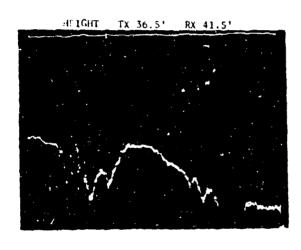
13 db/cm below zero
REFLRENCE LIVE
CABLE ATTH. THOUDED 5.0-7.7 db

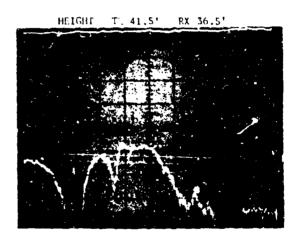
FREQUENCY RANGE

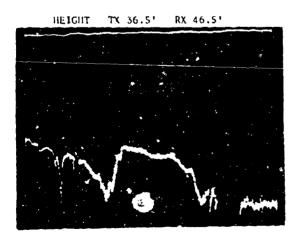
200-450 MEZ

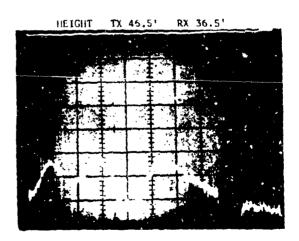
FREQUENCY SCALE

20 MHZ/CM









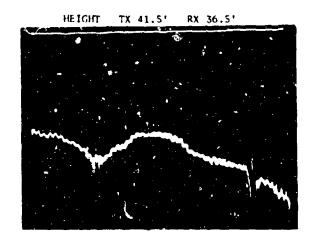
HEIGHT TX 36.5' RX 36.5'

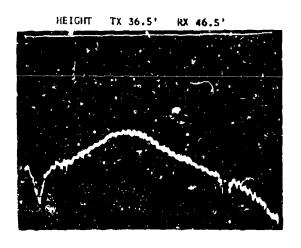
TRANSMIT RECEIVE AS-1181 AT-197 HORZ, SEPARATION - 20FT.

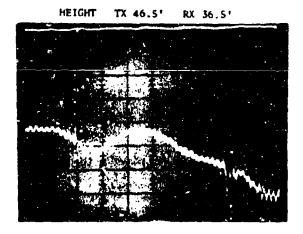
REC. PWR/GEN PWR 10 de/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 5.0-7.7 db

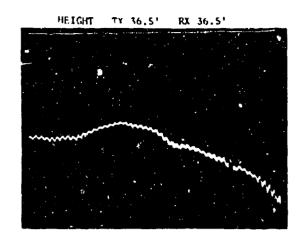
FREQUENCY RANGE 200-400 MHz
FREQUENCY SCALE 20 MHz/CM

HEIGHT TX 36.5' RX 41.5'





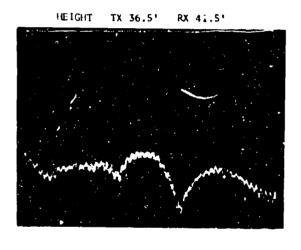


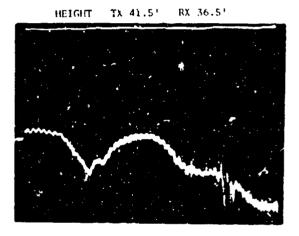


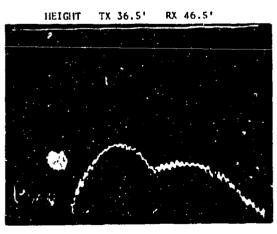
TRANSMIT RECEIVE AS-1181 AS-1018 HORZ, SEPARATION - 20 FT.

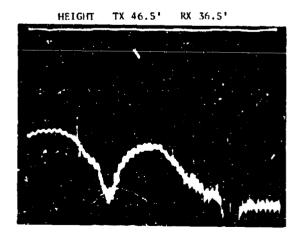
REC. PWR/GEW PWR 10 du/CM ZELOW ZERO REFERENCE LINE CABLE ATTN. LICEUDED 5.0-7./ dw

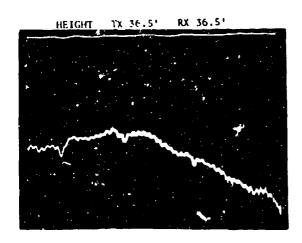
FREQUENCY RANGE 200-400 MHz
FREQUENCY SCALE 20 MHz/CH











RECEIVE TRANSMIT AS-1181 AS-1097 HORZ. SEPARATION - 20 FT.

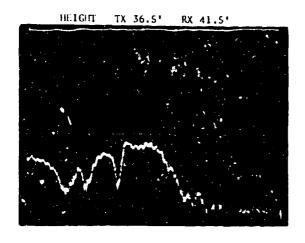
REC. PWR/GEN PWR 10 db/cm delow zero REFERENCE LINE CABLE ATTH. FRICLUDED 5.0-7.7 db

FREQUENCY RANGE

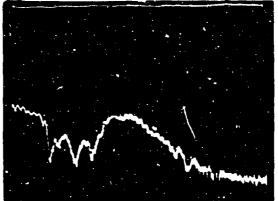
200-400 MI:z

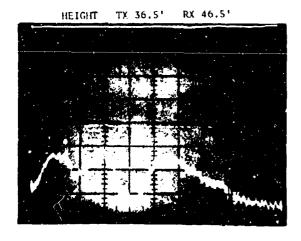
FREQUENCY SCALE

20 Mriz/CM

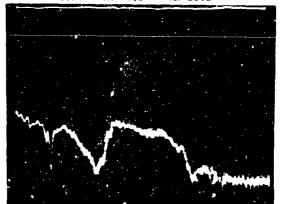


HEIGHT TX 41.5' RX 36.5'





HEIGHT TX 46.5' RX 36.5'

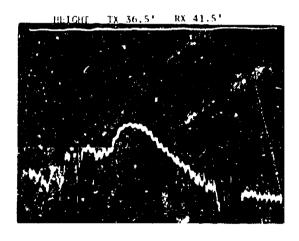


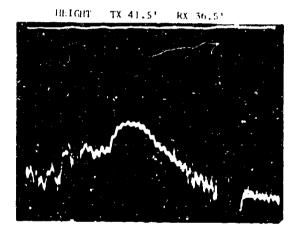
ANTENNA
TRANSMIT RECEIVE
AS-1181 AS-1181
HORZ. SEPARATION - 20 FT.

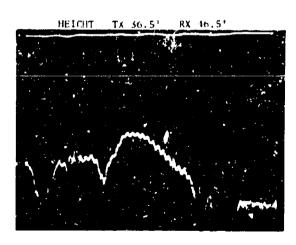
REG. PARZGER PAR TO dUZCH BELOW ZERO REFERENCE LERE CABLE ATTA: MICLLULU 3.0-7.7 das

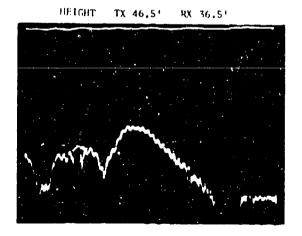
FREQUENCY RAINE 200-400 MIZ

FREQUENCY SCALE 20 Miz/CH







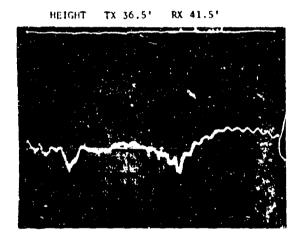


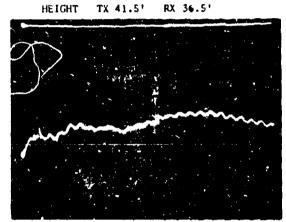
HEIGHT TX 36.5' RX 36.5'

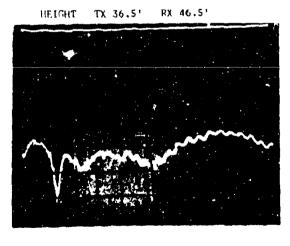
ANTENNA
TRANSMIT RECEIVE
AS-1181 AT-197
HORZ. SEPARATION - 20 FT

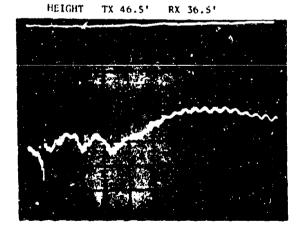
REC. PWR/GEN, PWP 10dB/CM BELOW ZERO REFERENCE LINE CABLE ATTN. INCLUDED 3.4-5.0 dB

FREQUENCY RANGE 100-200 MHZ
FREQUENCY SCALE 10 MHZ/CM

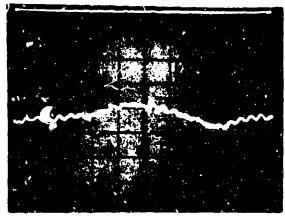








*** IOHT | TX 36.51 | EX 36.51



ANTENNA
TRANSMIT RECEIVE
AS-1181 AS-1018
HOR2. SEPARATION - 20 FT.

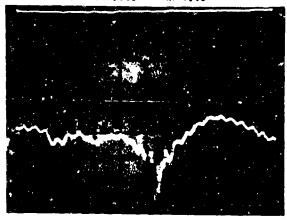
REC. PWR/GEN. PWR 10dB/CM BELOW ZERO REFERE CE LINE CABLE ATIN. INCLUDED 3.4-5.0 dB

FREQUENCY RANGE

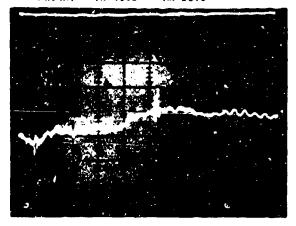
100-200 MHZ

FREQUENCY SCALE 10 MH2/CM

"EIGHT TX 36.3" RX 41.5"



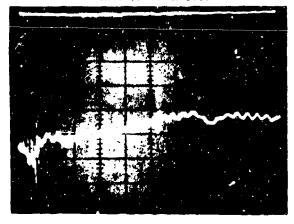
BLIGHT TX 41.5' RA 36.5'

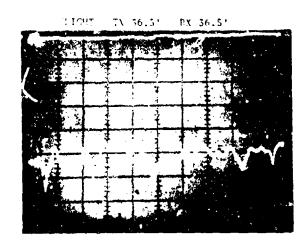


EELICET TV 56.5' RX 46.5'



HEIGHT TX 46.5' RX 36.5'

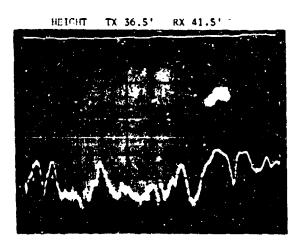


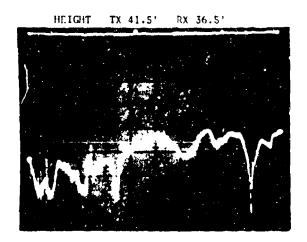


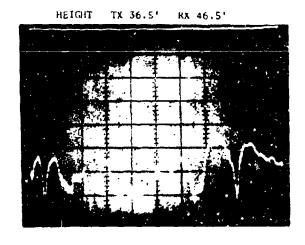
ANTENNA
TRANSMIT RECEIVE
AS-1181 AS-1097
HORZ. SEPARATION - 20 FT.

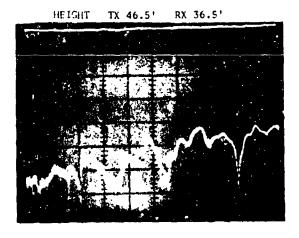
RFC. PWR/GEN. PWR 10dB/CM BELOW ZERO RFFERENCE LINE CABLE ATTN. INCLUDED 3.4-5.0 dB

FREQUENCY RANGE 100-200 MHZ
FREQUENCY SCALE 10 MHZ/CM







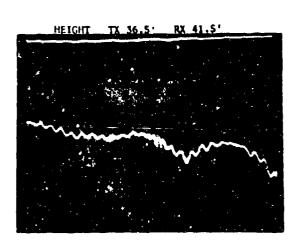


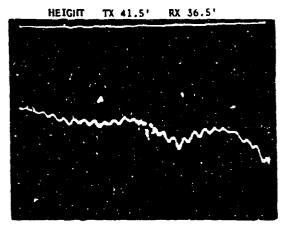


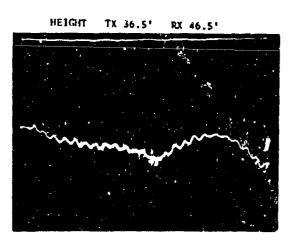
ANTENNA TRANSMIT RECEIVE AS-1181 AS-1181 HORZ. SEPARATION - 20 FT.

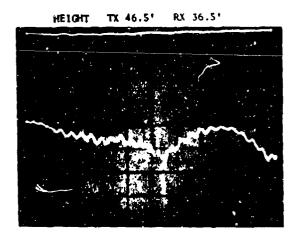
REC.PWR/GEN. PWR 10 dB/CM BELOW ZERG REFERENCE LINE CABLE ATTN. INCLUDED 3.4-5.0 dB

FREQUENCY RANGE 100-200 MHZ PREQUENCY SCALE 10 MHZ/CM









MISSION of Rome Air Development Center

X&XX&XX&XX&XX

RADC plans and conducts research, exploratory and advanced development programs in command, control, and communications (C³) activities, and in the C³ areas of information sciences and intelligence. The principal technical mission areas are communications, electromagnetic guidance and control, surveillance of ground and aerospace objects, intelligence data collection and handling, information system technology, ionospheric propagation, solid state sciences, microwave physics and electronic reliability, maintainability and compatibility.



